Important Note!

This »Maintenance Manual« is an original service guide of the ITHACA PERIPHERALS.

If you want to order spare parts at the
OKI Systems (Deutschland) GmbH please give the spare part number and the model name of the machine.

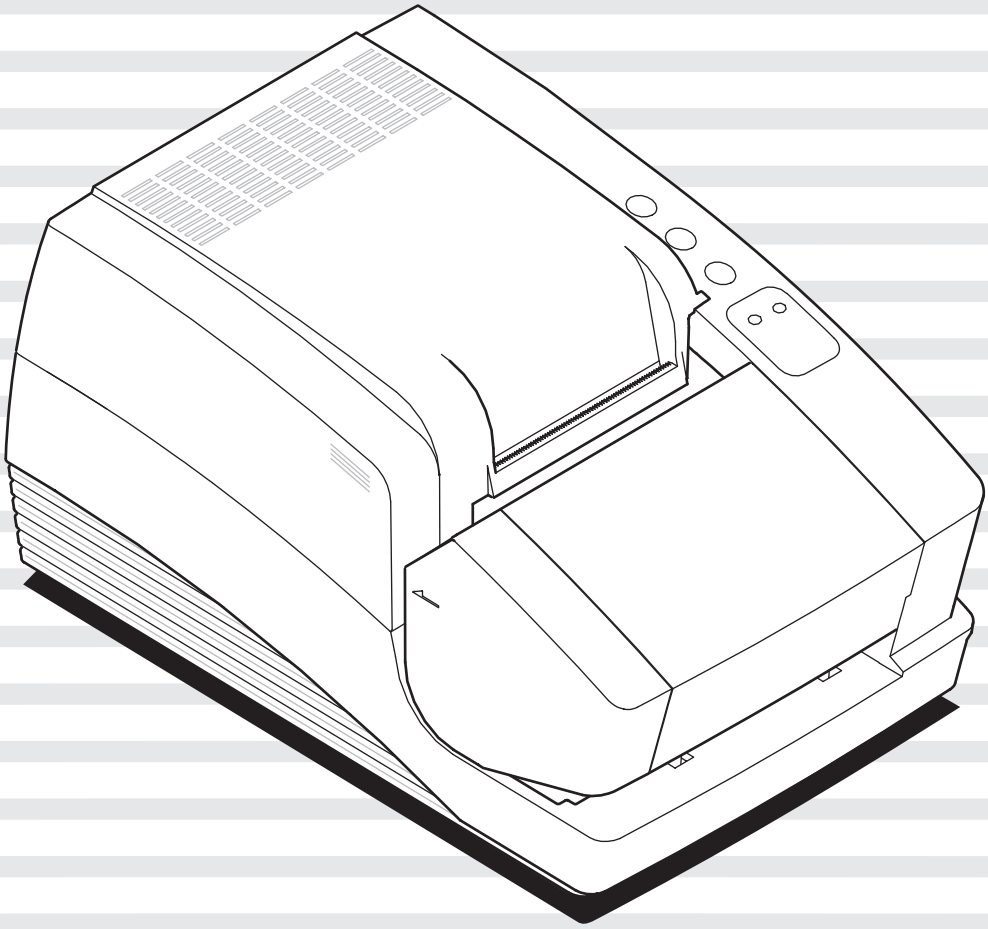
Wichtiger Hinweis!

Dieses »Maintenance Manual« ist ein Original-Service-Handbuch der ITHACA PERIPHERALS.

Wenn Sie bei OKI Systems (Deutschland) GmbH Ersatzteile bestellen, geben Sie immer die Ersatzteilnummer und die Gerätebezeichnung an.

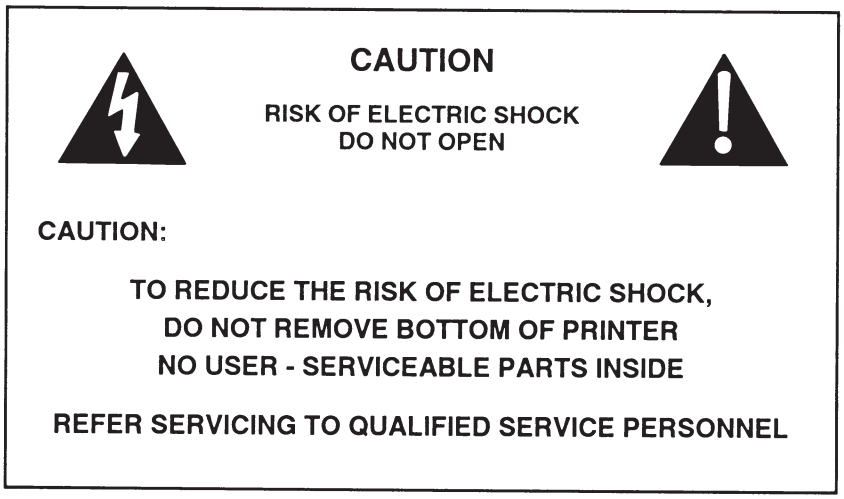
PcOS SERIES 90

MAINTENANCE MANUAL



ITHACA®

ITHACA PERIPHERALS
A Transact Technologies Incoporated Company


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE BOTTOM OF PRINTER
NO USER - SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

WARNING: To prevent fire or shock hazard, do not expose this printer to rain or moisture.

Disclaimer

Information in this publication is subject to change without notice and does not represent a commitment on the part of Ithaca Peripherals, A Transact Technologies Incorporated Company. However, as product improvements become available, Ithaca Peripherals Incorporated will make every effort to provide updated information for the products described in this publication.
Ithaca Peripherals cannot guarantee that changes in software and equipment made by other manufacturers, and referred to in this publication, do not affect the applicability of the information in this publication.

Copyright

Copyright © 1996
Ithaca Peripherals
A Transact Technologies Incorporated Company
Ithaca, New York USA
Printed in USA

Revision A, October 1996

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, photocopying, recording, or otherwise, without the prior written permission of Ithaca Peripherals.

Trademarks

Ithaca® and PcOS ® are registered trademarks of Ithaca Peripherals. IBM is a registered trademark of the International Business Machines Corporation. Ithaca Peripherals is a Transact Technologies Incorporated Company.

Federal Communications Commission
Radio Frequency Interference Statement

This equipment complies with the limits for a Class A computing device in accordance with the specifications in Part 15 of FCC rules which are designed to minimize radio frequency interference in the installation; however, there is no guarantee that radio or television interference will not occur in any particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on while the radio or television is on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the radio or television receiving antenna;
- Relocate the printer with respect to the receiver;
- Move the printer away from the receiver;
- Plug the printer into a different outlet so that the printer and the receiver are on different circuits.

If necessary the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio/TV Interference Problems.*
This booklet is available from the US Government Printing Office, Washington, DC 20402. Order stock number 004-000-00345-4.

Canadian Department of Communications
Radio Interference Statement

This Ithaca Peripherals Inc. apparatus does not exceed Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

UL, CSA, VDE, CE Statement

Ithaca Peripherals Incorporated printers are UL & CSA Listed, VDE Certified, and carry the CE Mark.

TABLE OF CONTENTS

PRODUCT INFORMATION 1

WHAT IS IN THIS BOOK? 1
- WHO IS IT FOR? 1
- WHAT DOES IT COVER? 1
- WHERE CAN YOU FIND MORE INFORMATION? 1
- CONTACTING ITHACA PERIPHERALS 1

WARRANTY INFORMATION 2
- OPTIONS 2
- SERVICE INFORMATION 2

ORDERING SUPPLIES 3
- PAPER 3
- RIBBON CASSETTES 3
- TAKE-UP SPOOLS 4
- PRINTHEAD 4
- CABLES 4

DESCRIPTION OF THE SERIES 90 PRINTER 5
- SERIES 90 MODELS 5
- STANDARD FEATURES 6
- OPTIONAL FEATURES 7

TECHNICAL SPECIFICATIONS 8
- PRINTING SPECIFICATIONS 8
- PRINT CHARACTERISTICS 8
- RELIABILITY 9
- DIMENSIONS 9
- WEIGHT 9
- POWER REQUIREMENTS 9
- ENVIRONMENTAL CONDITIONS 9

COMMUNICATION INTERFACES AND CASH DRAWER CONNECTORS . 10
- SERIAL CABLE 10
- PARALLEL CABLE 12
- CASH DRAWER PIN ASSIGNMENTS 12

CLEANING AND ADJUSTMENTS..... 13

CLEANING THE PRINTER 13

MAKING ADJUSTMENTS 13
- DIAGNOSING THE PRINT QUALITY 13
- NECESSARY TOOLS 14
- ADJUSTING THE PLATEN GAP 15

ADJUSTING THE PLATEN PARALLEL TO THE PRINTHEAD 16

ASSEMBLY/DISASSEMBLY..... 17

PRECAUTIONS FOR DISASSEMBLY 17
NECESSARY TOOLS.....17

DISCONNECTING THE POWER CORD 18

DISCONNECT THE COMMUNICATION CABLE.....19
DISCONNECT THE SERIAL CABLE 19
DISCONNECT THE PARALLEL CABLE.....19
DISCONNECTING THE CASH DRAWER CABLES 20

REMOVE THE RIBBON CASSETTE 20
INSTALLING THE RIBBON CASSETTE.....21

PRINTHEAD 22
REMOVE THE USED PRINTHEAD 22
PUT IN THE NEW PRINTHEAD.....24

REMOVE THE COVERS.....26

TAKE-UP MOTOR ASSEMBLY KIT.....30

MECHANICAL BASE ASSEMBLY 32

25 PIN PARALLEL INTERFACE CABLE.....34

9 PIN SERIAL INTERFACE CABLE.....35

CASH DRAWER HARNESSES.....36

POWER SUPPLY ASSEMBLY 37

POWER SWITCH AND AC INLET ASSEMBLY 38

CONTROLLER BOARD ASSEMBLY.....39

KEYPAD PC BOARD 40

CARRIER/ CAM PLATE 41

CAM PLATE.....44

CARRIER ASSEMBLY.....46

REMOVE PRINT MECHANISM ASSEMBLY 48

PRINT MECHANISM ASSEMBLY 49

CARRIAGE ASSEMBLY.....50

CARRIAGE MOTOR 51

LINEFEED MOTOR.....52

TROUBLESHOOTING.....53

DETERMINING THE PROBLEM.....53

LED INDICATORS 68

PRINTER FAULT INDICATORS.....69

CHECKING CONNECTIONS AND RESISTANCE....71
PRINTHEAD....71
SPACE MOTOR ASSEMBLY....72
LINEFEED MOTOR (SLIP)....73
LINEFEED MOTOR (RECEIPT)....73

APPENDIX A: THEORY OF OPERATION....74

ELECTRICAL OPERATION....75
CIRCUIT OPERATION....75
MICROPROCESSOR AND PERIPHERAL CIRCUITS....76
MICROPROCESSOR (U1: 80C154)....76
PROGRAM ROM (U4)....76
PROGRAM RAM (U2)....76
RAM (U5)....76
LSI (M7U042-026)....76
INITIALIZATION....77
INTERFACE CONTROL....77
PARALLEL INTERFACE....77
SERIAL INTERFACE....77
PRINTHEAD DRIVE CIRCUIT....78
CARRIAGE DRIVE....78
SPACE MOTOR CONTROL....78
SLIT ENCODER....79
LINEFEED....80
ALARM CIRCUITS....80
DRIVE CIRCUIT FAULT ALARM CIRCUIT....80
HEAD OVERHEAT ALARM CIRCUIT....80
POWER SUPPLY....81
AC INPUT....81
MECHANICAL OPERATION....81
PRINTHEAD MECHANISM AND OPERATION....81
PRINTHEAD OPERATION....82
SPACE MECHANISM AND OPERATION....82
RIBBON FEED MECHANISM AND OPERATION....82
RIBBON FEED OPERATION....83
RIBBON CARTRIDGE....83
PAPER FEED MECHANISM AND OPERATION....83
RECEIPT FEED MOTOR....83
SLIP FEED MOTOR....84
PAPER-LOW DETECTION MECHANISM AND OPERATION....84

APPENDIX B: PARTS LISTS 85

PACKING MATERIALS/PUBLICATIONS 86
PRINTER ASSEMBLY 87
PAPER COVER ASSEMBLY (90-7449) 89
PAPER COVER ASSEMBLY WITH LOCK (90-7443) 90
RIGHT COVER ASSEMBLY (90-7464) 92
RIGHT COVER ASSEMBLY WITH LOCK (90-7470) 93
BASE CABINET AND TAKE-UP MOTOR 94
TAKE-UP MOTOR ASSEMBLY 95
MECH/ELEC BASE ASSEMBLY 96
MECH/ELEC BASE ASSEMBLY (CONT'D) 97
MECHANISM BASE ASSEMBLY - MODELS 91/92 98
MECHANISM BASE ASSEMBLY - MODELS 93/94 99
MECHANISM BASE ASSEMBLY - MODELS 93/94 (CONT'D) 100
CARRIER/CAM PLATE ASSEMBLY 101
CAM PLATE ASSEMBLY 101
CARRIER ASSEMBLY 103
PRINT MECHANISM ASSEMBLY 104
CARRIAGE ASSEMBLY 105
CARRIAGE MOTOR ASSEMBLY 106
ELECTRONICS BASE ASSEMBLY 107

APPENDIX C: SCHEMATICS 108

INDEX 108

PRODUCT INFORMATION

WHAT IS IN THIS BOOK?

WHO IS IT FOR?

This book is a maintenance guide intended for trained technicians who service this printer.

WHAT DOES IT COVER?

Of course, this book only covers the Series 90 Printer, not the entire point-of-sale system, but it will tell you all you need to know about maintaining and servicing the printer properly. You will find out how to clean and adjust the printer, how to troubleshoot problems, and disassemble the printer.
This book also provides some general and technical information about the printer, so you'll know what the features are, how reliable it is, and what its printing capabilities are.

WHERE CAN YOU FIND MORE INFORMATION?

A Programming Guide is available if you need to know how to program a point-of-sale terminal or a PC to work with the printer. It describes all the commands the printer recognizes to perform its functions.
An Operator's Guide is also available and is for new and experienced operators. It covers setting up and using the Series 90 Printer with any point-of- sales system.
For information about ordering these books, refer to the next section.

CONTACTING ITHACA PERIPHERALS

Contact your dealer first for general information about the Series 90 Printer and how it works with your system. If you need more specific information about the printer, you may contact Ithaca Peripherals directly. The Sales Department and the Technical Support Department will be able to help you with most of your questions.
Contact the Technical Support Department to receive technical support, to order documentation, and to receive additional information about the Series 90 Printer. To order supplies, or to receive information about other products by Ithaca Peripherals, contact the Sale Department.
Contact the Technical Support Department if you would like information about your warranty, or if you need to send a printer in for service.
You can contact both the Sales department and the Technical Support Department at the following address and phone or fax numbers:

Ithaca Peripherals
20 Bomax Drive
Ithaca, NY 14850

Main phone:	(607) 257-8901
Main fax:	(607) 257-8922
Sales/ Technical Support fax:	(607) 257-3868

WARRANTY INFORMATION

OPTIONS

All Ithaca Peripherals Incorporated (Ithaca®) PcOS Series 90 Printers come with a standard 24 month warranty covering both parts and labor. An optional warranty, covering both parts and labor for 36 months, may be purchased separately.

For more information concerning the warranty options, please contact your dealer or the Sales department at Ithaca Peripherals. See “Contacting Ithaca Peripherals” on page 1 for the address and phone numbers for Ithaca Peripherals.

SERVICE INFORMATION

If you need a printer serviced, whether it's under warranty or not, call your dealer. You may have several options for service depending on the contract you have. Your dealer may service the printer directly or have a service agreement with a local service contractor.

If your dealer instructs you to send the printer to Ithaca Peripherals for service, or if you bought the printer directly from Ithaca Peripherals, call Technical Support at (607) 257-8901 and ask for a return authorization. Please have the model number and serial number of the printer available. The numbers are on a decal located on the back of the printer.
You will need to re-pack the printer and ship it directly to Ithaca Peripherals. Be sure to keep all the packing materials and the box. Please refer to "Unpacking the Printer" in the *Operator's Guide*.

ORDERING SUPPLIES

You may order supplies by calling Ithaca Peripherals or by faxing the order form that was shipped in the box with the printer. If you'd like more forms, just call Ithaca Peripherals.

- Call (607) 257-8901 and ask for the Sales department
- Fax the order form to (607) 257-3868

You can order the following supplies:

- Paper
- Ribbon Cassettes
- Take-up Spools
- Printhead
- Cables

PAPER

Paper	Type	Dimensions	Stock Number
Receipt Paper	Single Ply	3.25 inches (Width) 3.5 inches (Diameter) 240 feet (Length)	100-2203
Receipt-Journal Paper	Double Ply	3.25 inches (Width) 3.5 inches (Diameter) 125 feet (Length)	100-2206
Receipt-Journal Paper	Triple Ply	3.25 inches (Width) 3.5 inches (Diameter) 85 feet (Length)	100-2207

RIBBON CASSETTES

Color	Supplier	Stock Number
Black	Ithaca Peripherals	100-7565
Purple	Ithaca Peripherals	100-7859

Note: The warranty may be voided if other than genuine Ithaca Peripherals ribbons are used.

TAKE-UP SPOOLS

Take-up Spool	Stock Number
Journal Take-up Spool	90-6415

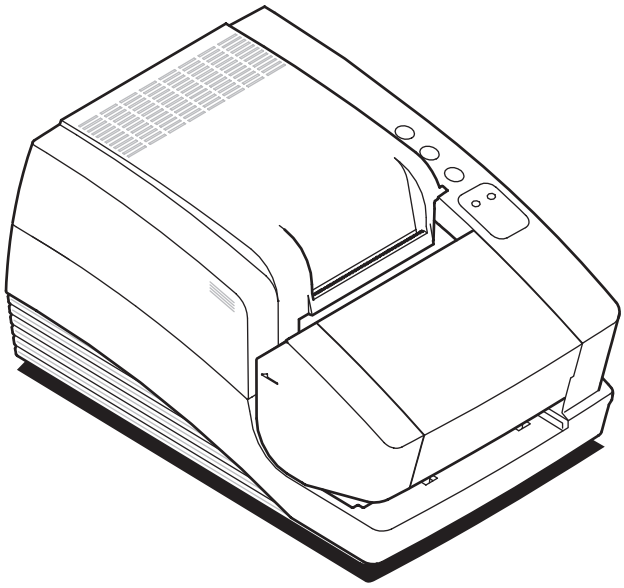
PRINTHEAD

Printhead and Clamp	Stock Number
Printhead	S90-7337
Printhead Clamp	06-0571

CABLES

Cables	Stock Number
110V Power Cable	06-0561
220V Power Cable	06-0806
Parallel Communication Cable	253-9800007
Serial Communication Cable	
PC, 9-Pin Female to 9-Pin Female	10-2020
PC, 9-Pin Female to 25-Pin Female	10-2021

DESCRIPTION OF THE SERIES 90 PRINTER



The PcOS (personal computer, point-of-sale) Series 90 Printer is a stand-alone, 40-column, high-speed impact printer. The Series 90 Printer performs a variety of functions in a point-of-sale environment and is available in the following models:

- Model 91: Receipt only
- Model 92: Receipt and Journal
- Model 93: Receipt, Journal, and Slip/Validation
- Model 94: Receipt and Slip/Validation

SERIES 90 MODELS

Each of the four models in the Series 90 line of printers has its own unique set of features.

PcOS Model 91 Receipt Printer

The model 91 is a receipt printer used for applications requiring high-speed printing of receipts and single-line validation.

- 300 characters per second bi-directional printing
- 42-column printing at 15 characters per inch

PcOS Model 92 Receipt and Journal Printer

The model 92 is a receipt and journal printer used for applications requiring a transaction audit trail (journal) in addition to high-speed printing of receipts and single-line validation.

- 300 characters per second bi-directional printing
- 42-column printing at 15 characters per inch
- Journal take-up

PcOS Model 93 Receipt, Journal, and Slip/Validation Printer

The model 93 is a receipt, journal, and slip/validation printer used for applications requiring printing of up to 17 lines on inserted forms such as checks (for validation) or printing on charge slips, Guest Checks, or personal checks (slip mode). In addition, it provides the same high-speed journal and receipt printing as the model 92.

- 300 characters per second bi-directional printing
- 42-column printing at 15 characters per inch
- Journal take-up
- Form insertion sensor
- 17-line validation
- Front slip insertion

PcOS Model 94 Receipt and Slip/Validation Printer

The model 94 is a receipt and slip/validation printer used for applications requiring printing of up to 17 lines on inserted forms such as checks (for validation) or printing on charge slips, Guest Checks, or personal checks (slip mode). It does not include the journal take-up assembly.

- 300 characters per second bi-directional printing
- 42-column printing at 15 characters per inch
- Form insertion sensor
- 17-line validation
- Front slip insertion

STANDARD FEATURES

The following features and items are standard on all Series 90 printers:

- Centronics parallel interface with 2K buffer
- Internal International Power Supply (95 to 265 VAC)

- Operating controls and lights
  - Power on/off switch and indicator
  - Paper Feed button
  - Forms Release button
  - Resume button
  - Alarm and Forms LEDs
- Paper Low sensor
- Operator controlled self-test
- Cash drawer connector (RJ12) and driver (24V, 1.5 amp pulse for approximately 150 ms; drawer open/closed status reporting)
- Nine-pin stored energy printhead
- Short line seeking logic

- Characters and Graphics
  - Lower-case characters with descenders
  - 300 characters per second bi-directional printing
  - 42-column printing at 15 characters per inch
  - Emphasized and enhanced print
  - IBM compatible all points addressable graphics
- Software controlled vertical spacing
- Snap-on ribbon cassette
- Steel receipt tear-off bar

OPTIONAL FEATURES

The optional features either replace a standard feature or enhance the operation of the printer. All optional features are installed at the factory and must be selected when the printer is ordered.

- RS-232C serial communication interface
- RS-422 serial communication interface
- Journal cover lock
- Custom colors and logo

TECHNICAL SPECIFICATIONS

PRINTING SPECIFICATIONS

- Printing method: Impact dot matrix
- Head wire arrangement: 9 pins in line
- Print wire diameter: 0.34 mm. (0.012 in.)
- Print wire pitch: 0.353 mm. (0.013 in.)
- Print directions: bi-directional, logic seeking
- Print zone: 71.12 mm. (2.8 in.)

PRINT CHARACTERISTICS

The Series 90 Printer prints characters in a variety of pitches as shown in the following table. Each pitch can also be printed in a variety of styles affecting the appearance of the characters and the speed of the printer. For information about programming the printer to print a particular pitch or style, please refer to the *Programmer's Guide*. You can order the *Programmer's Guide* from Ithaca Peripherals. See "Contacting Ithaca Peripherals" on page 1.

Pitch (Characters per Inch)	Maximum Characters per Line	Char/Sec.
8 CPI	22	250
10 CPI	28	270
12 CPI	32	300
15 CPI	42	300
17.1(Condensed)	48	300
20 (Super Condensed)	56	300
24 (Super Condensed)	66	300
4 (Double-Wide)	11	150
6 (Double-Wide)	16	150

7.5 (Double-Wide)	21	150
8.5 (Condensed Double-Wide)	24	150
10 (Condensed, Double-Wide)	28	150
12 (Super Condensed, Double-Wide)	33	150

RELIABILITY

- Mean time between failure (except printhead): 30,000 hours (M91)
- Printhead life: 200 million characters
- Mean time to repair: 15 minutes

DIMENSIONS

- Width: 7.3 inches
- Length: 12.25 inches
- Height: 6.0 inches

WEIGHT

- Approximate weight: 10 pounds
- Approximate shipping weight: 13 pounds

POWER REQUIREMENTS

The Model 90 is designed to be AC self powered in domestic and international markets. The printer is equipped with a universal input power supply that is designed to operate world wide without modification.

Supply Voltage Rating (VAC)	Supply Voltage Range (VAC)	Frequency (HZ)	Rated Power (watts)	Current (Amps) Idle	Current (Amps) Printing
100 - 240	90 - 264	47 - 63	45	0.08 @ 120VAC 0.04 @ 240VAC	0.9 @ 120VAC 0.4 @ 240VAC

ENVIRONMENTAL CONDITIONS

The printer will run at its best when stored and operated in an environment that meets the following temperature and humidity conditions:

- Operating temperature: 0° to 50°C (32° to 122°F)
- Storage temperature: -10° to +60°C (-14° to +140°F)
- Operating relative humidity: 10% to 90% (non-condensing)
- Storage relative humidity: 5% to 90%

COMMUNICATION INTERFACES AND CASH DRAWER CONNECTORS

SERIAL CABLE

Cable Requirements

The PcOS Series 90 Printer requires an RS-232C shielded cable, no more than 50 feet long. The cable must be UL and CSA approved.

RS-232C Communication

The RS-232C interface uses the following protocol and communication characteristics:

- Up to 19.2K Baud
- Up to 6K Buffer
- Ready/Busy or XON/XOFF Protocol
- Communications Diagnostic Mode

Pin Assignments for 9-pin Printer Connector

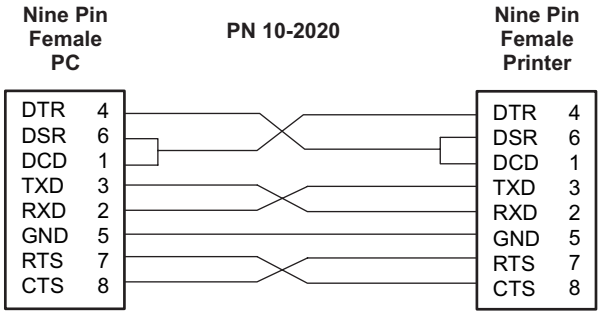
Pin	Name	Description
Pin 1	DCD	Data Carrier Detect
Pin 2	RX	Receive Data
Pin 3	TX	Transmit Data
Pin 4	DTR	Data Terminal Ready
Pin 5	GND	Signal Ground
Pin 6	DSR	Data Set Ready
Pin 7	RTS	Request To Send
Pin 8	CTS	Clear To Send
Pin 9	SSD	Secondary Data

Serial Cable Configurations

The following cable configurations are for different host requirements.

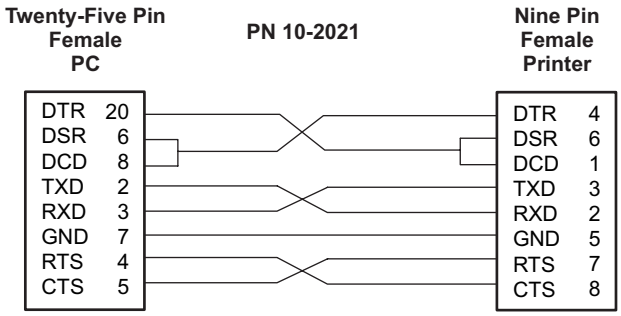
Serial PC to Series 90 (Null Modem)

Ithaca Peripherals part number: 10-2020 9-pin to 9-pin female. Use this cable for PcOS Series 90 printers connected to PC's or PS/2's with 9-pin serial ports.



Serial AT to Series 90 (Null Modem)

Ithaca Peripherals part number: 10-2021. Use this cable for PcOS Series 90 printers connected to PC's or PS/2's with 25-pin serial ports.



PARALLEL CABLE

Cable Requirements

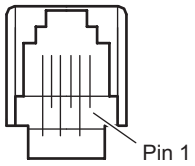
The PcOS Series 90 Printer requires a 25-pin male D-Shell connector at the printer. To connect the printer to most PC's use Ithaca Peripherals part number: 253-9800007 25-pin male to 25-pin male parallel interconnect cable.

Pin Assignments

Pin	Signal	Description	Direction
Pin 1	STROBE	Clock Data to printer	Host to Printer
Pin 2-9	D0 - D7	Data	Host to Printer
Pin 10	ACK\	Printer Accepted Data	Printer to Host
Pin 11	BUSY	Printer is Busy	Printer to Host
Pin 12	PE	Paper Out / Status	Printer to Host
Pin 13	SLCT	Printer Selected	Printer to Host
Pin 14	AUTOFD	Auto feed paper	Host to Printer
Pin 15	ERR\	Printer Error	Printer to Host
Pin 16	INIT\	Initialize the Printer	Host to Printer
Pin 17	SLIN	Select Printer	Host to Printer
Pin 18-25	GND	Ground	

CASH DRAWER PIN ASSIGNMENTS

Function	Drawer 1	Drawer 2
Drawer Drive +	Pin 4	Pin 4
Drawer Drive -	Pin 5	Pin 1
Status Signal	Pin 2	Pin 2
Status Ground	Pin 3	Pin 3
Frame Ground	Pin 6	Pin 6



CLEANING AND ADJUSTMENTS

CLEANING THE PRINTER

Remove paper dust periodically by using a vacuum cleaner or air compressor.

Caution: Do not use alcohol or petroleum-based chemicals to clean the printer as these will damage the plastic parts. The Carriage Rack is particularly sensitive and will be permanently damaged if exposed to these chemicals. Take special care not to get the cleaner on any electronic components.

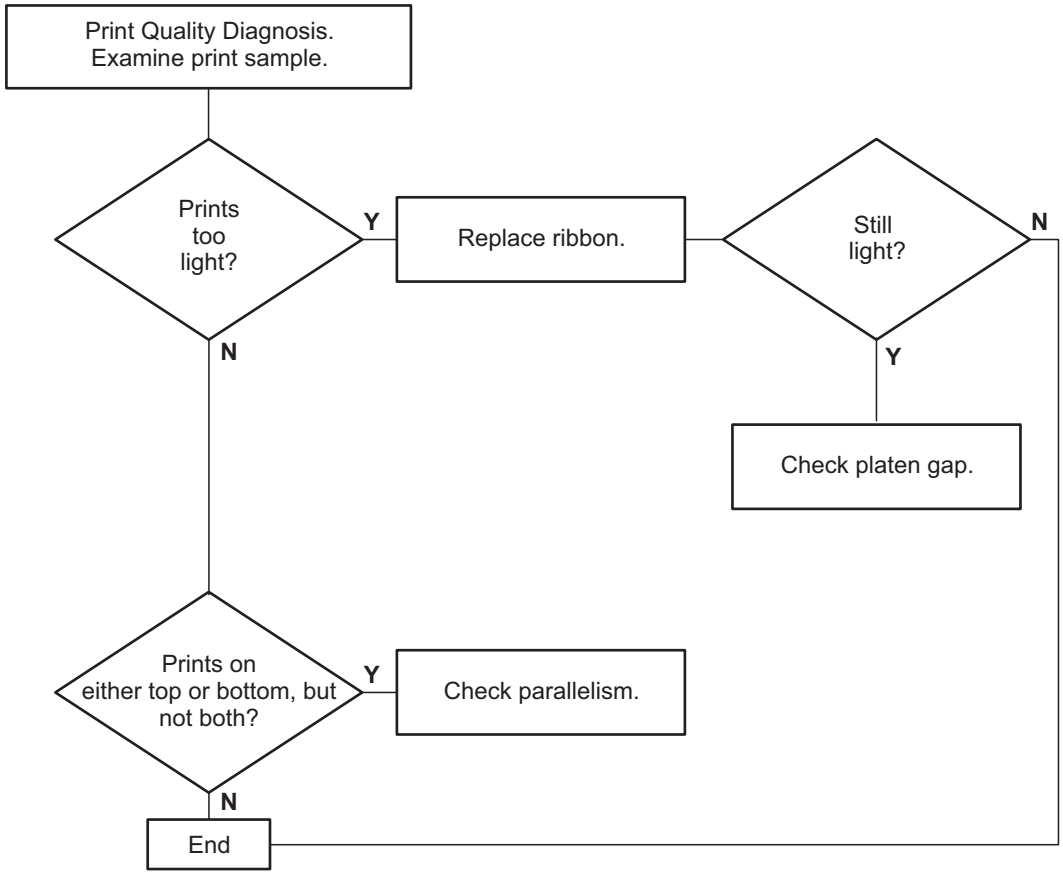
None of the internal parts of the printer require lubrication or routine maintenance. Apply a common cleaner such as fantastik® or Formula 409® to a damp cloth and gently wipe the surface of the printer, even the keypad.

MAKING ADJUSTMENTS

The adjustments described in this section are required only to correct Printhead drag or print quality flaws. If the print density on a print sample is consistent from top to bottom, and the Printhead does not drag, no adjustment is necessary. If the Printhead drags, adjust the platen gap for the thickness of paper being used. If the print sample is inconsistent, adjust the printhead parallelism.

DIAGNOSING THE PRINT QUALITY

Use the flowchart on the following page to determine which procedure to use to correct the specified print problems.



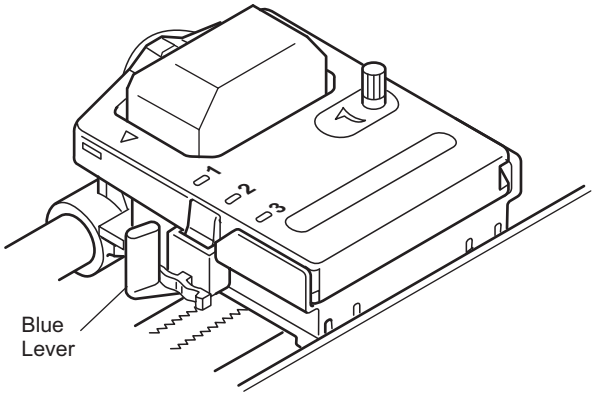
NECESSARY TOOLS

Caution: Using the wrong tools may cause personal injury or damage the printer. Be sure to use the proper tools when maintaining or servicing the Series 90 Printer.

The following list provides the necessary tools needed to properly maintain the Series 90 Printer.

- #1 Phillips
- Thickness Gauge: .016 Inch
- Paper Clip

ADJUSTING THE PLATEN GAP



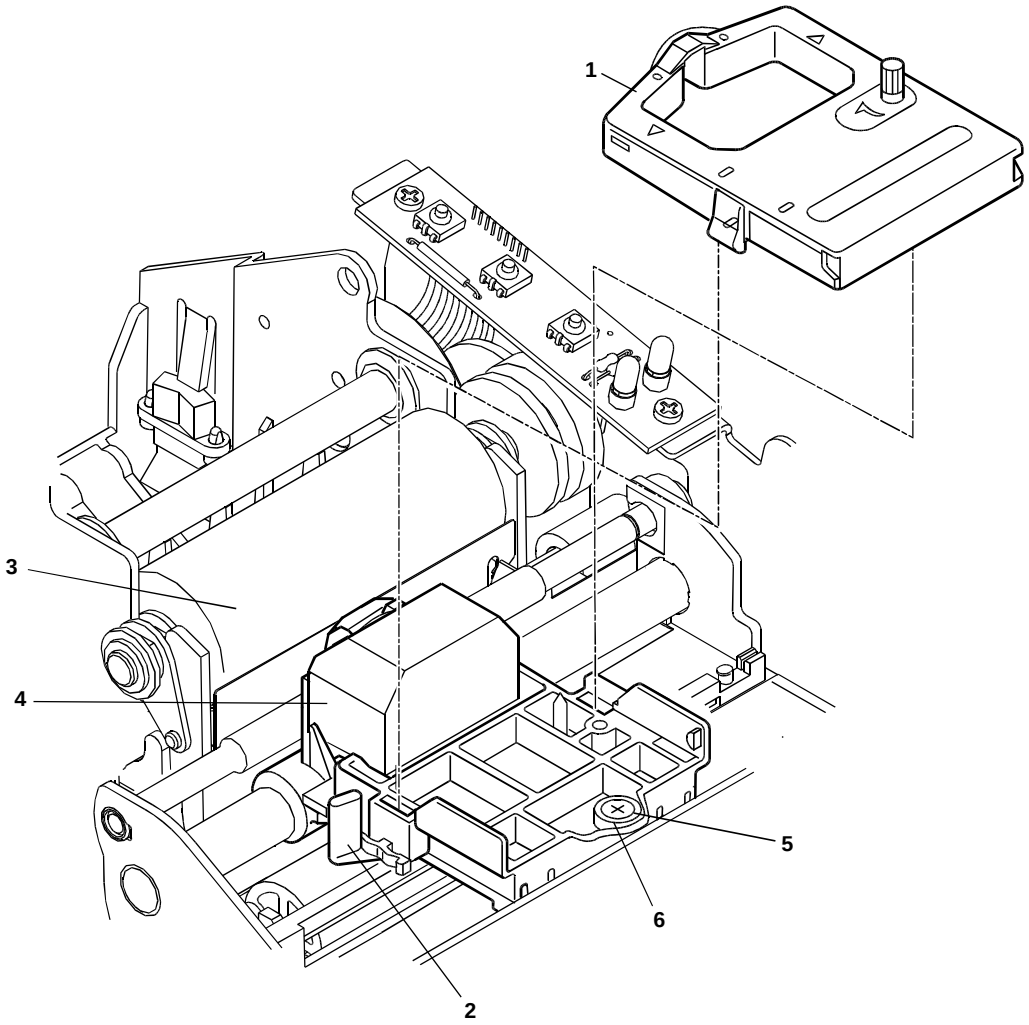
The gap between the printhead and the platen can be adjusted to accommodate the thickness of different paper. If the gap is not set properly, the characters can smudge, the printhead can jam, and the density of the characters will be less than ideal.

Adjust the printhead gap by moving the blue lever, located to the left of the ribbon cassette, to one of three positions. Open the cassette cover to reach the lever.

Set the gap to one of the following:

- Position 1: One-ply paper
- Position 2: Two-ply paper
- Position 3: Three-ply paper

ADJUSTING THE PLATEN PARALLEL TO THE PRINTHEAD



1. Turn off the printer.
2. Remove all paper from the printer.
3. Remove the Ribbon Cassette (1).
4. Set the Range Adjustment Lever (2) to position 1 (towards the rear of the printer).

   The Range Adjustment Lever (2) is the blue lever on the Printhead (4).
5. Sight along the length of the Platen (3) from the side of the printer to observe the parallelism of the air gap between the Platen (3) and the Printhead (4).
6. Press down on the outer ring of the Adjusting Gear (6) with the straightened end of a paper clip and turn the Adjusting Screw (5) with a #1 Phillips screwdriver until the gap measures 0.406 ± 0.0762 mm (0.016 ± 0.003 in.).

ASSEMBLY/DISASSEMBLY

PRECAUTIONS FOR DISASSEMBLY

Before disassembling any part of the printer, be sure the power is turned off. Disconnect the AC power cord, the communication cable, and the cash drawer cables.

Caution: Controller board and the keypad PC board can easily be damaged by static electricity. Observe ESD precautions, wear a grounded wrist strap and use a static mat or other protected work surface. Do not place the printed circuit boards directly on the printer or floor.

NECESSARY TOOLS

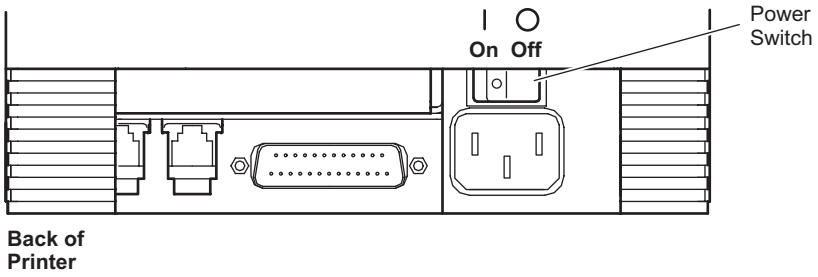
Caution: Using the wrong tools may cause personal injury or damage the printer. Be sure to use the proper tolls when maintaining or servicing the printer.

The following list provides the necessary tools to properly maintain the Series 90 Printer.

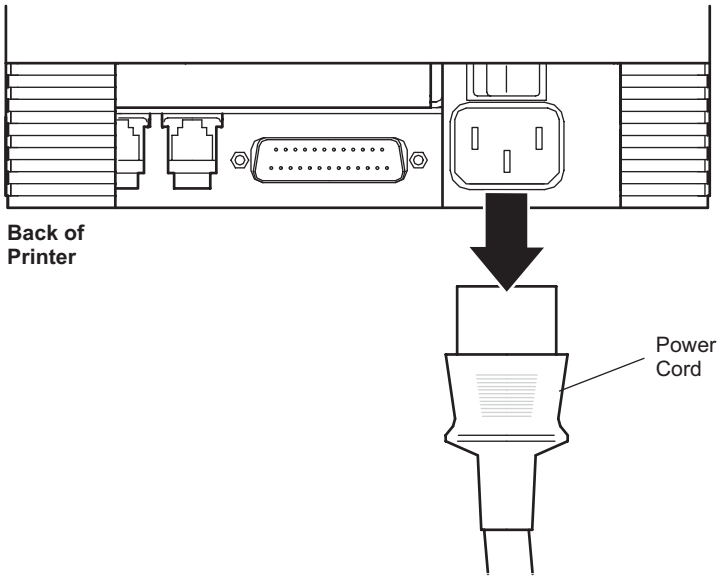
- Screwdrivers
  - #0 Phillips
  - #1 Phillips
  - #2 Phillips
  - Small Flat Blade
  - Large Flat Blade
- Nut Drivers
  - 3 mm
- Miscellaneous
  - Thickness Gauge: .016 Inch
  - Hobby Knife
  - Small Needle-Nose Pliers

DISCONNECTING THE POWER CORD

Caution: The printer must be grounded through the three-prong power connector. DO NOT use any ground defeating adapter.



1. Be sure the power switch is turned off.

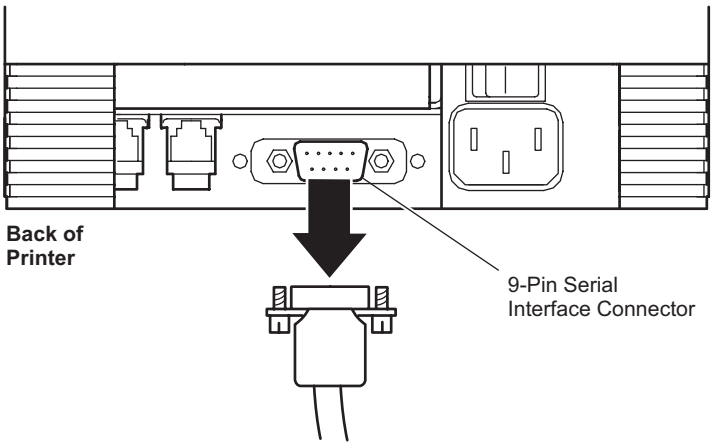


2. Disconnect the external AC power source and the power cord from the power socket located on the back of the printer.

DISCONNECT THE COMMUNICATION CABLE

Depending on the interface your system uses, disconnect either the serial or parallel communication cable to the appropriate connector on the back of the printer.

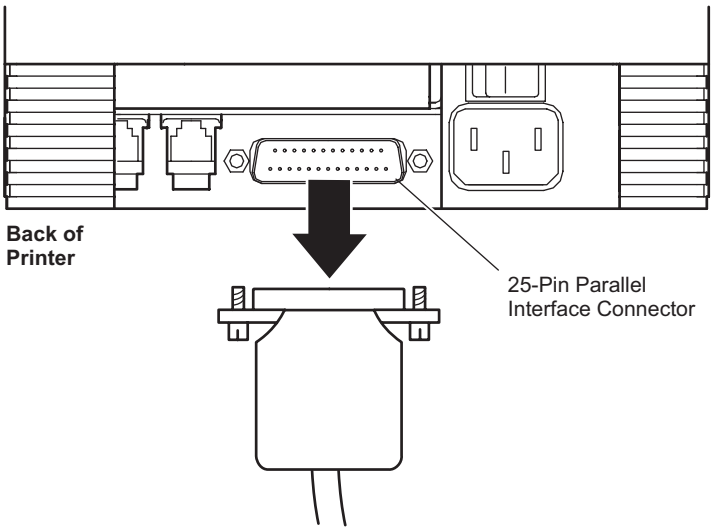
DISCONNECT THE SERIAL CABLE



1. Turn the printer and the host system or PC off.
2. Loosen the two mounting screws on each side of the cable connector.
3. Disconnect the 9-pin serial interface cable from the connector located on the back of the printer.

   Refer to the “Communication Interfaces and Cash Drawer Connectors” for information on the serial cable requirements.

DISCONNECT THE PARALLEL CABLE

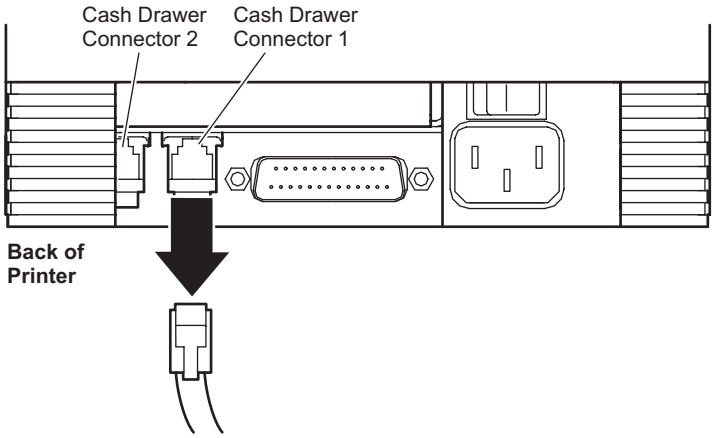


1. Turn the printer and the host system or PC off.

2. Disconnect the 25-pin parallel interface cable to the connector located on the back of the printer.

   Refer to the “Communication Interfaces and Cash Drawer Connectors” for information on the parallel cable requirements.

DISCONNECTING THE CASH DRAWER CABLES



1. Turn the printer off.
2. Disconnect the cash drawer cable to the connectors located on the back of the printer.

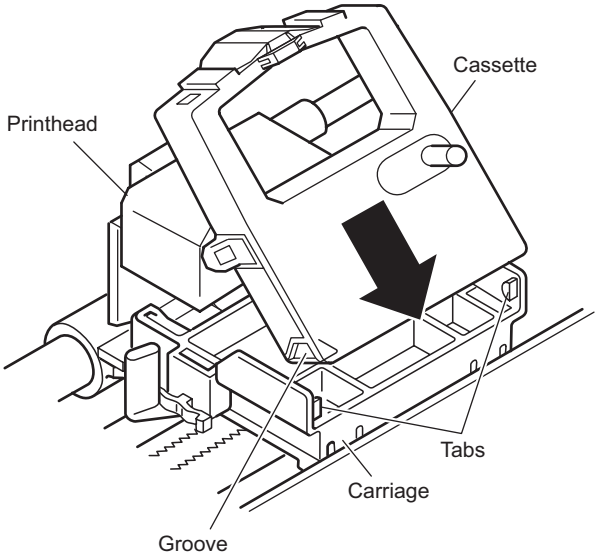
   Adapters are available for connecting cash drawers equipped with BNC style connectors (the standard is a modular, telephone style connector).

   Contact the Technical Support Department at Ithaca Peripherals for an adapter. See “Contacting Ithaca Peripherals” on page 1.

REMOVE THE RIBBON CASSETTE

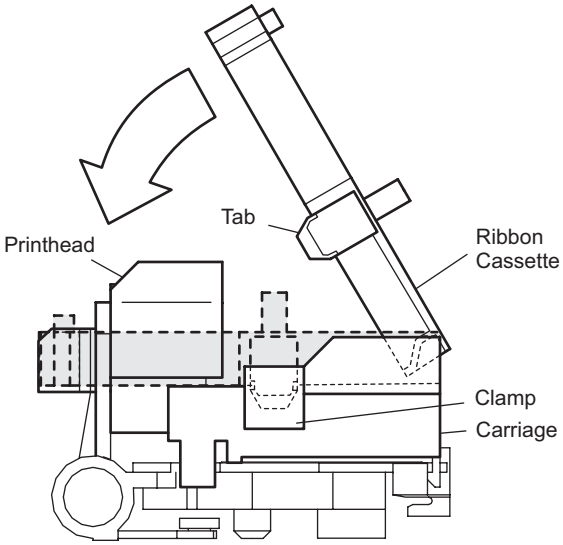
1. Grasp both sides of the cassette, lift and rock the cassette towards you. Don’t pull the cassette straight up.

INSTALLING THE RIBBON CASSETTE

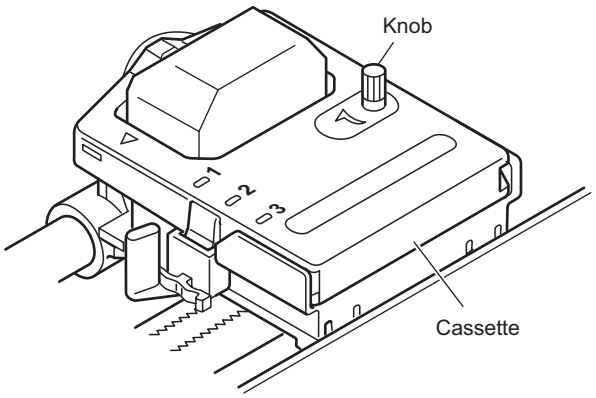


1. Holding the ribbon cassette with the mylar guide facing away from you, insert the front of the cassette into the carriage.

   Note: It is important to fit the front edge of the ribbon cassette into the carriage first. Do not place the ribbon cassette flat on the carriage.



2. Rock the ribbon cassette forward, toward the printhead and then press down on it until the tabs on the cassette snap into the clamps on the carriage.



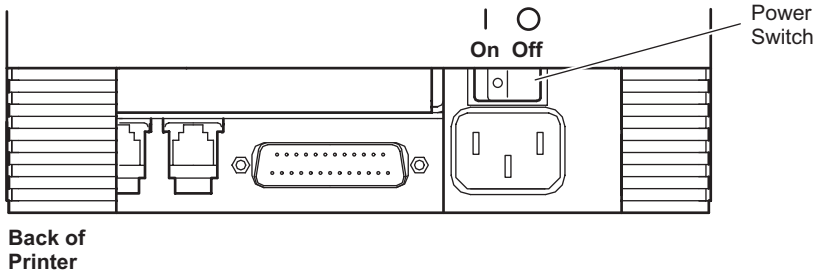
3. Tighten the ribbon by turning the knob on the cassette clockwise.
4. Close the cassette cover.
5. Turn the printer back on (if already installed).

PRINTHEAD

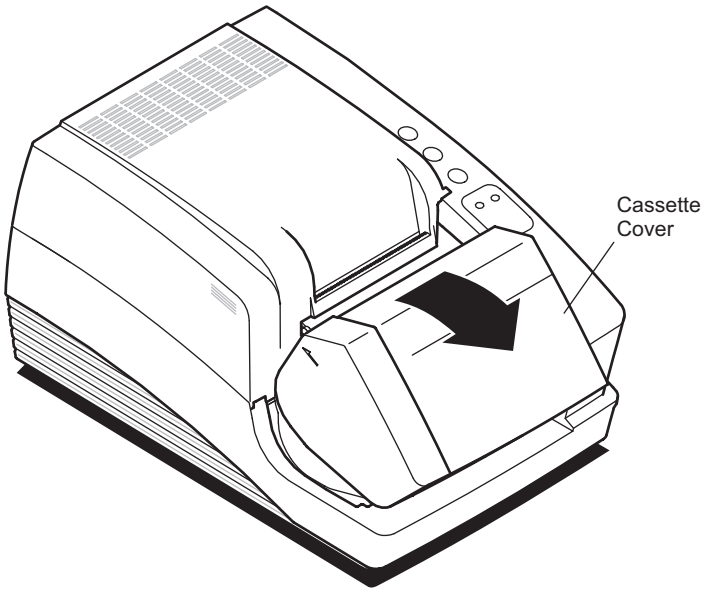
Replace the printhead when the characters are consistently misprinting.

REMOVE THE USED PRINTHEAD

Caution: The printhead can get very hot. Turn the printer off and allow the printhead to cool for at least three minutes before replacing it.

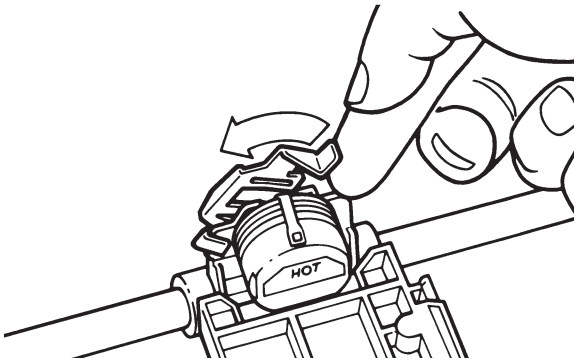


1. Turn the printer off.

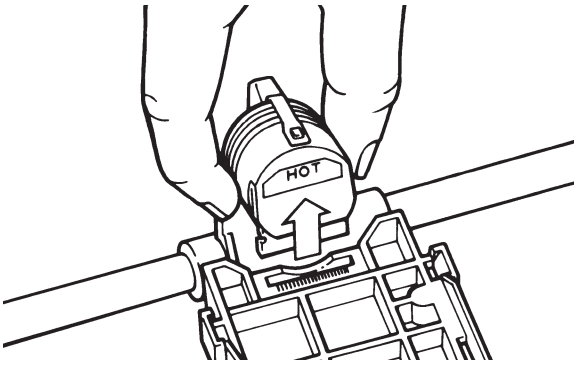


1. Open the cassette cover.
2. Remove the ribbon cassette.

Note: In the following illustrations, the heatsink is not shown for clarity.



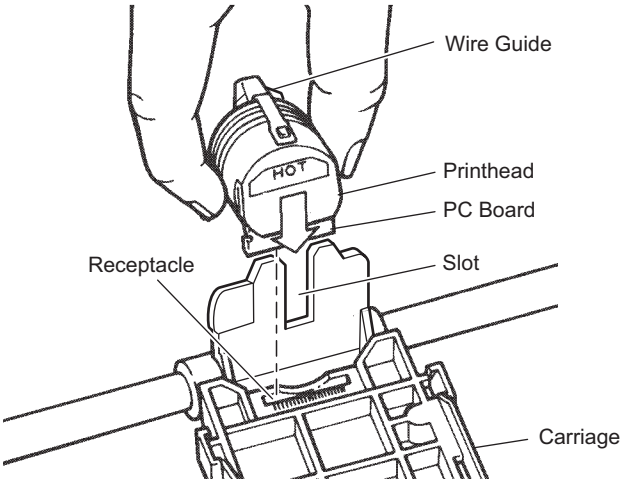
3. Open the printhead clip by grasping the tab on the right side of the clip and rotating it from right to left.



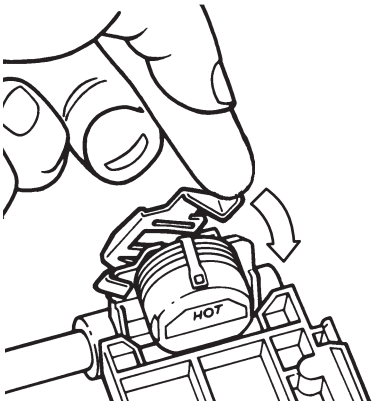
4. Lift the printhead straight up out of the carriage.

PUT IN THE NEW PRINTHEAD

Note: In the following illustration, the heatsink is not shown for clarity.

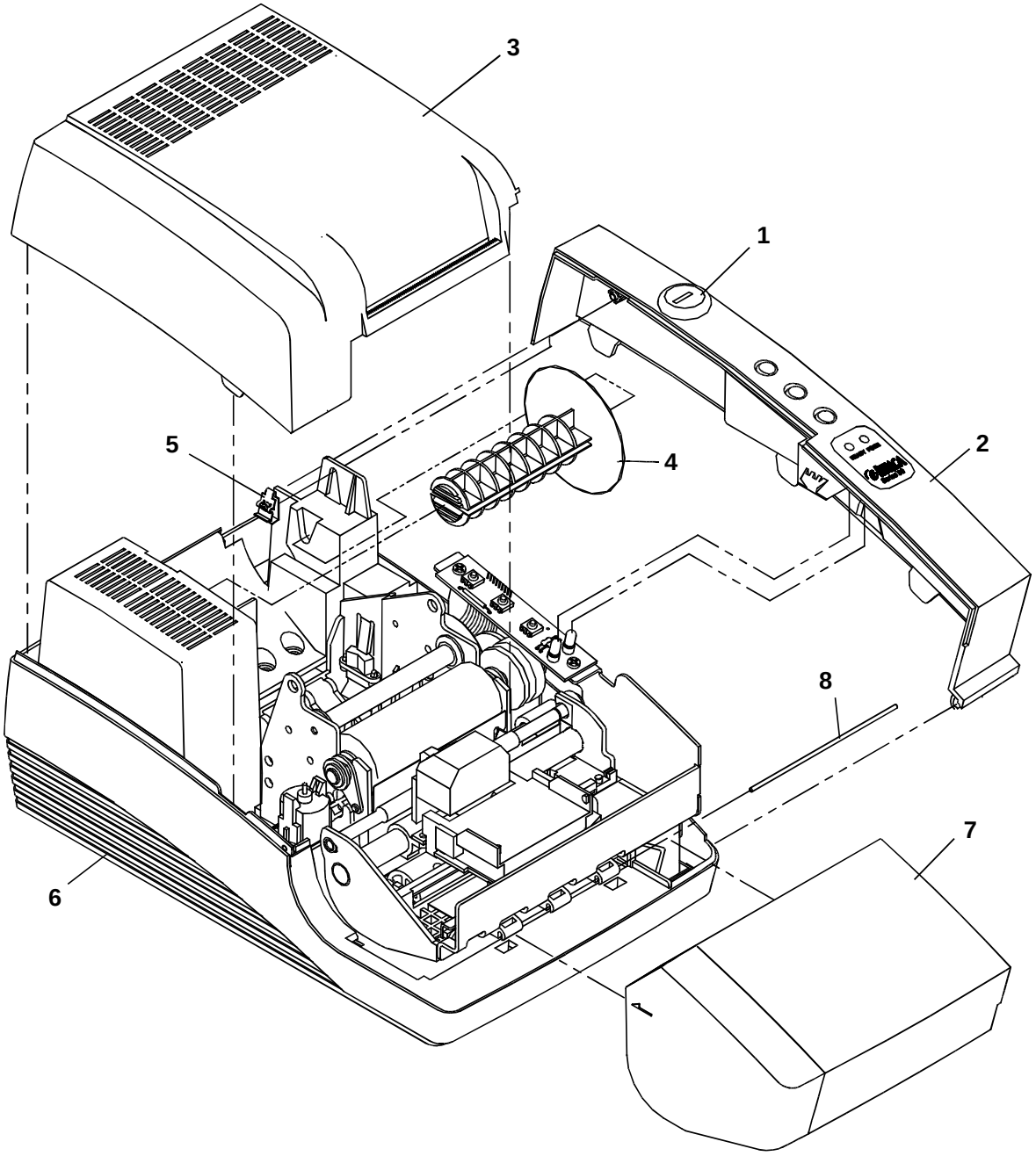


1. Slide the black wire guide on the back of the printhead into the slot on the carriage. Make sure the tabs on the wire guide hold the printhead against the carriage.
2. Align the PC board on the bottom of the printhead with the receptacle on the carriage.
3. Press the printhead into the carriage. Do not force the PC board into the receptacle. Make sure it is lined up properly.



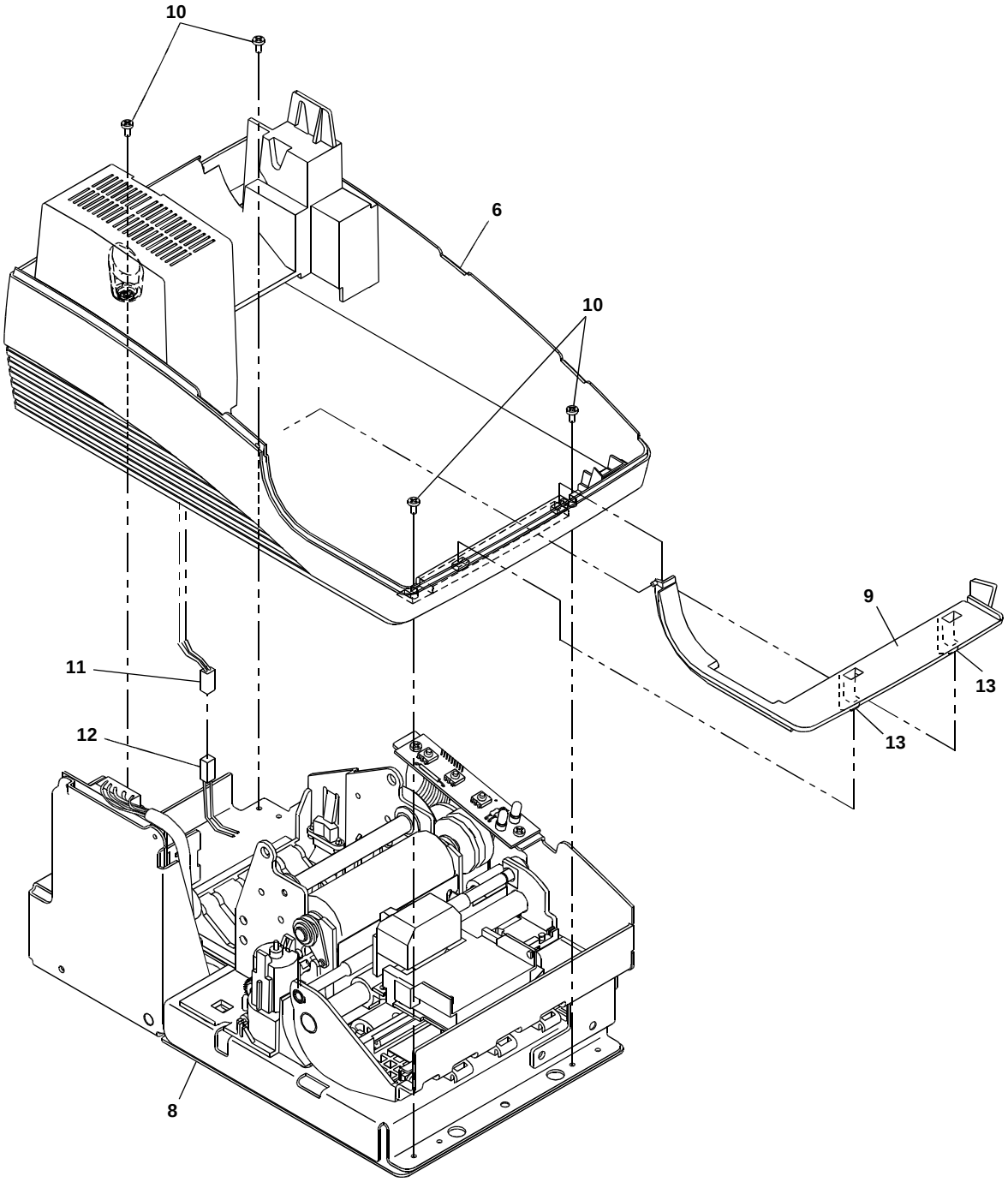
4. Close the printhead clip by rotating it from left to right and latching it into place.
5. Replace the ribbon cassette, and then close the cassette cover.

REMOVE THE COVERS



1. Unlock the optional journal lock (1) located the right cover (2).
2. Open the paper cover (3) until it unsnaps from the base cabinet (6).
3. Remove the takeup spindle (4).

4. Remove the clip (5) by using needle nose pliers squeezing the open ends on the clip and carefully remove the clip. Move the back corner of the right cover (2) to the right until the star stud clears the tower on the base cabinet (6). Rotate the back corner up and to the front until it is free from the base cabinet.
5. Open the cassette cover (7). Pull the hinge pin (8) out from the right and remove the cassette cover.



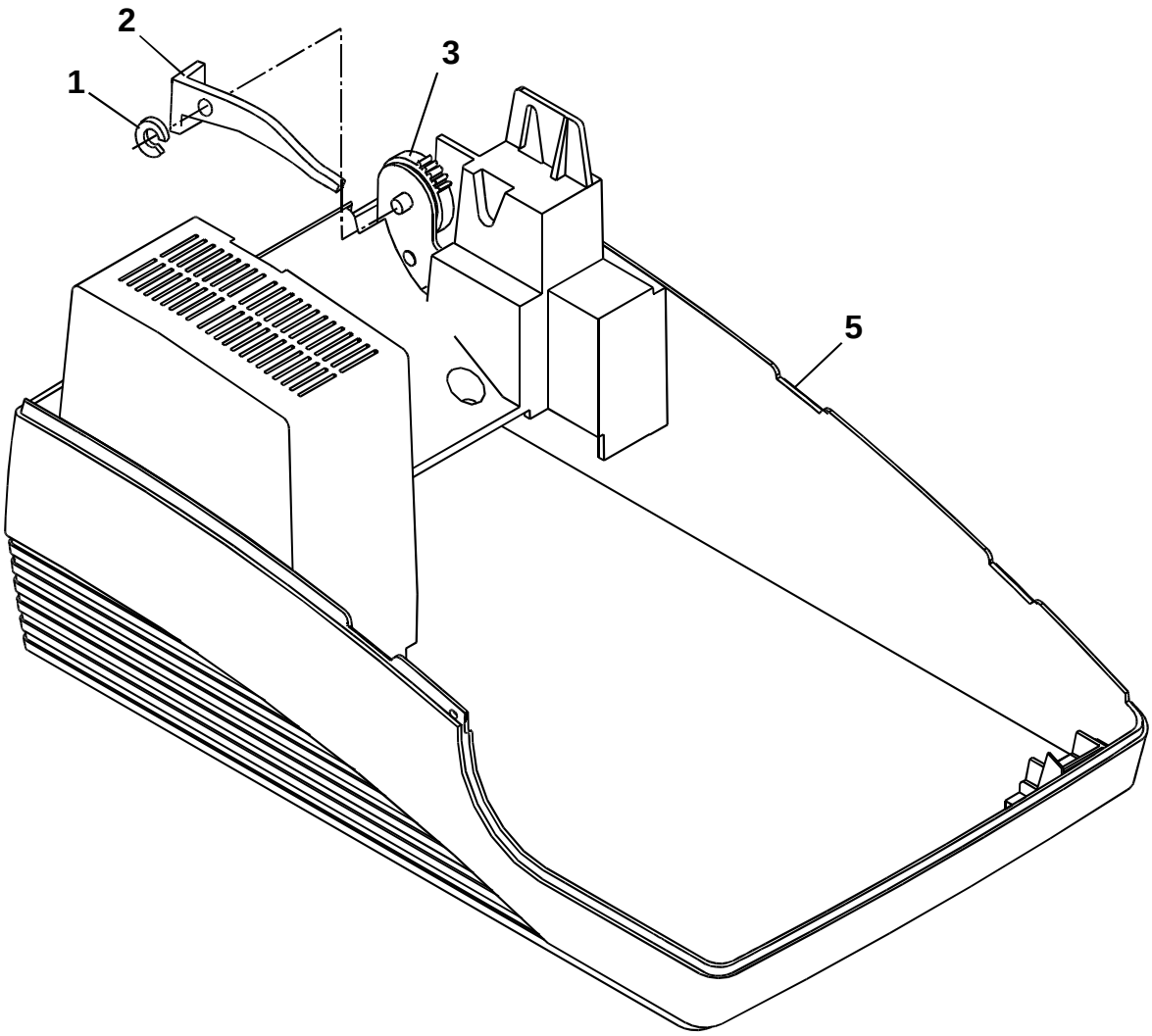
6. From the bottom of the mech/elec base assembly (8), insert a flat blade screwdriver through the holes in the front and unlatch the tabs (13) holding the cabinet bezel (9) to the base cabinet (6). Push on the left side of the cabinet bezel to free the pin from the cabinet base.

7. Remove the 4 screws (10) holding the base cabinet (6) to the mech/elec assembly (8). Lift the back of the base cabinet up and slide forward.

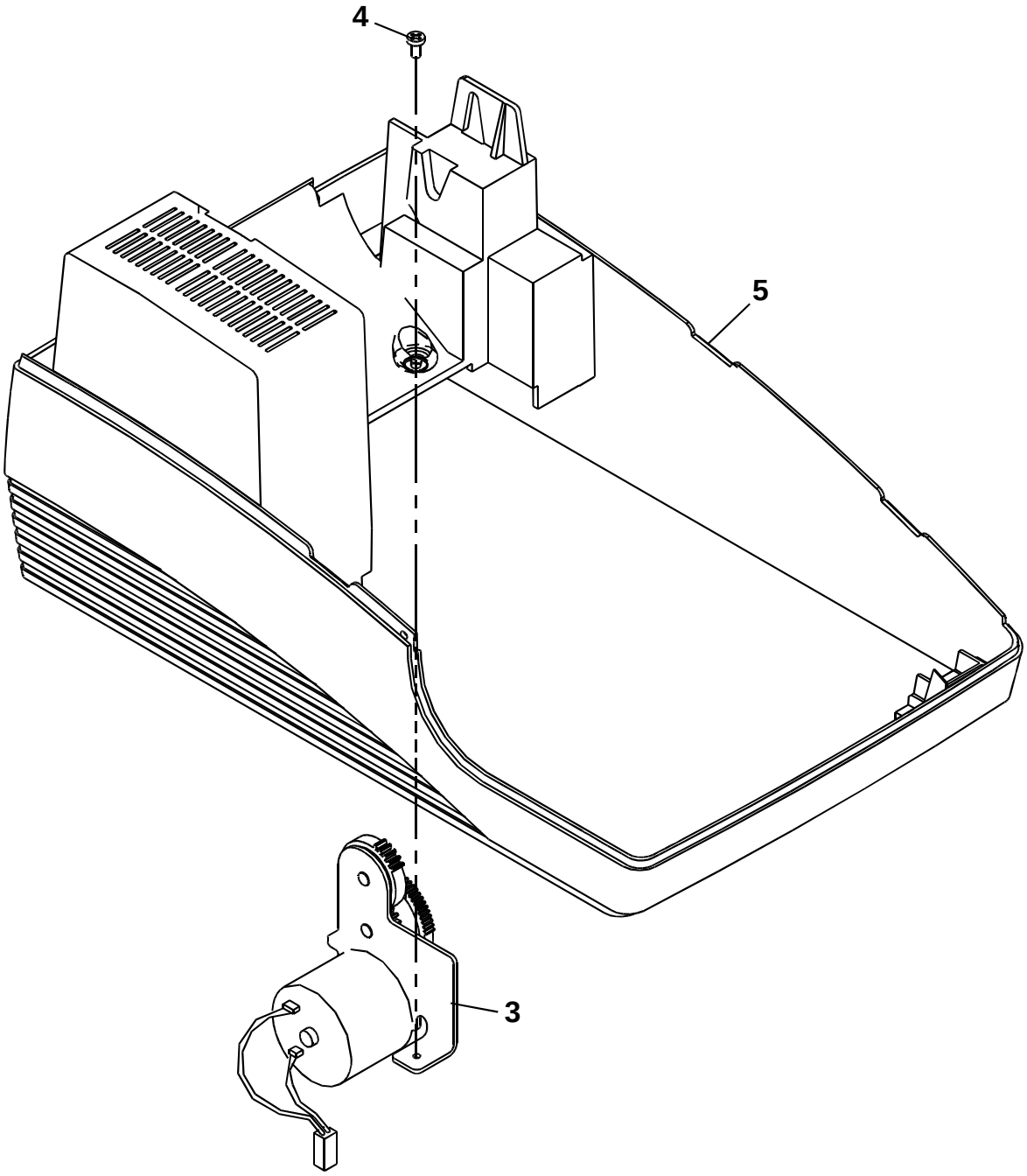
   Models 92 and 93, disconnect the take-up harness (11) from the take-up extension cable (12).

TAKE-UP MOTOR ASSEMBLY KIT

Models 92 & 93 only.

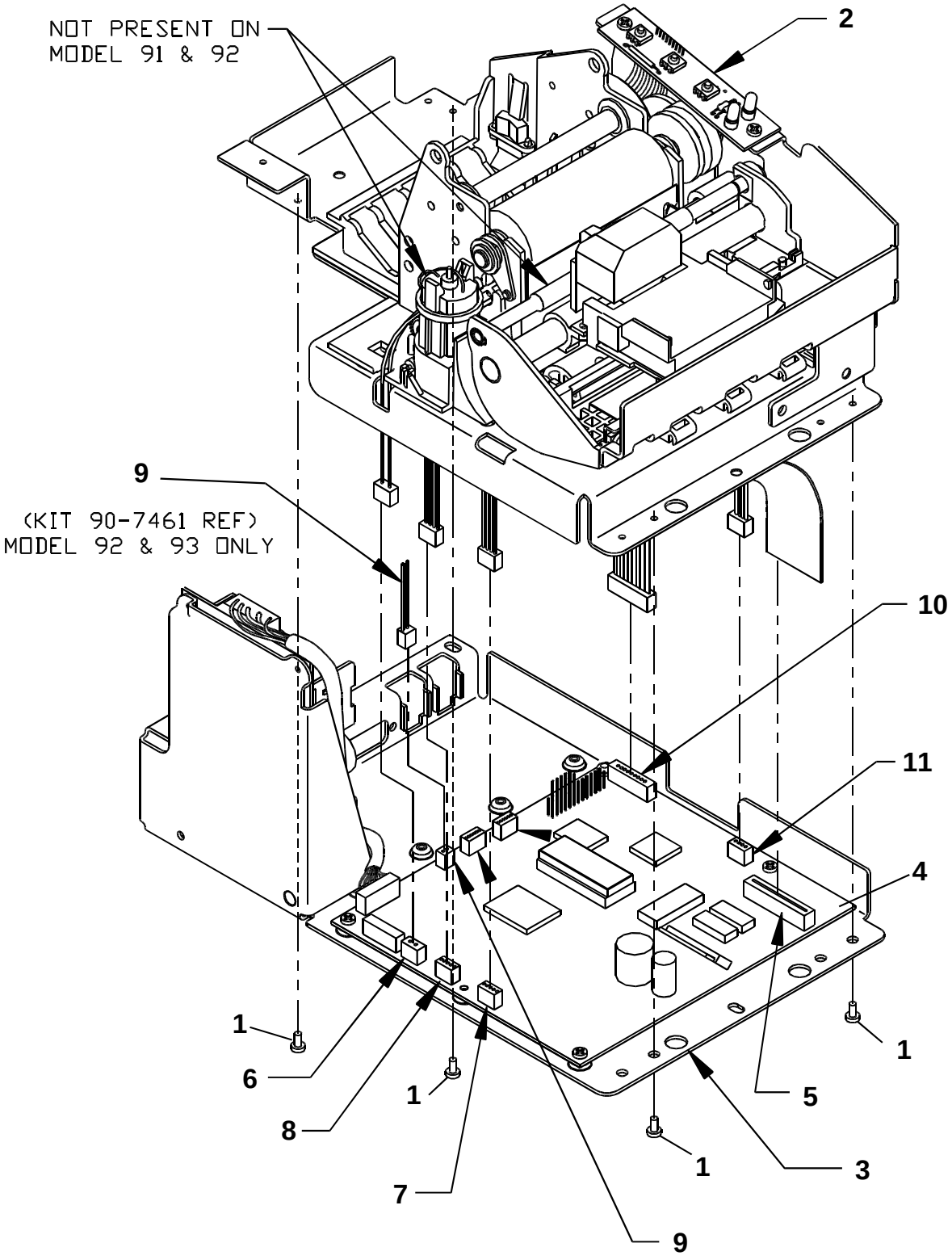


1. Remove the covers (see page 26).
2. Remove the E-ring (1) and slide off the arm (2) from the take-up motor assembly (3).



3. Remove the screw (4) holding the take-up assembly (3) to the base cabinet (5).
4. Release the take-up motor assembly (3) from the base cabinet (5). Move the bottom of the take-up motor assembly to the right until it clears the tab on the back wall of the base cabinet.

MECHANICAL BASE ASSEMBLY

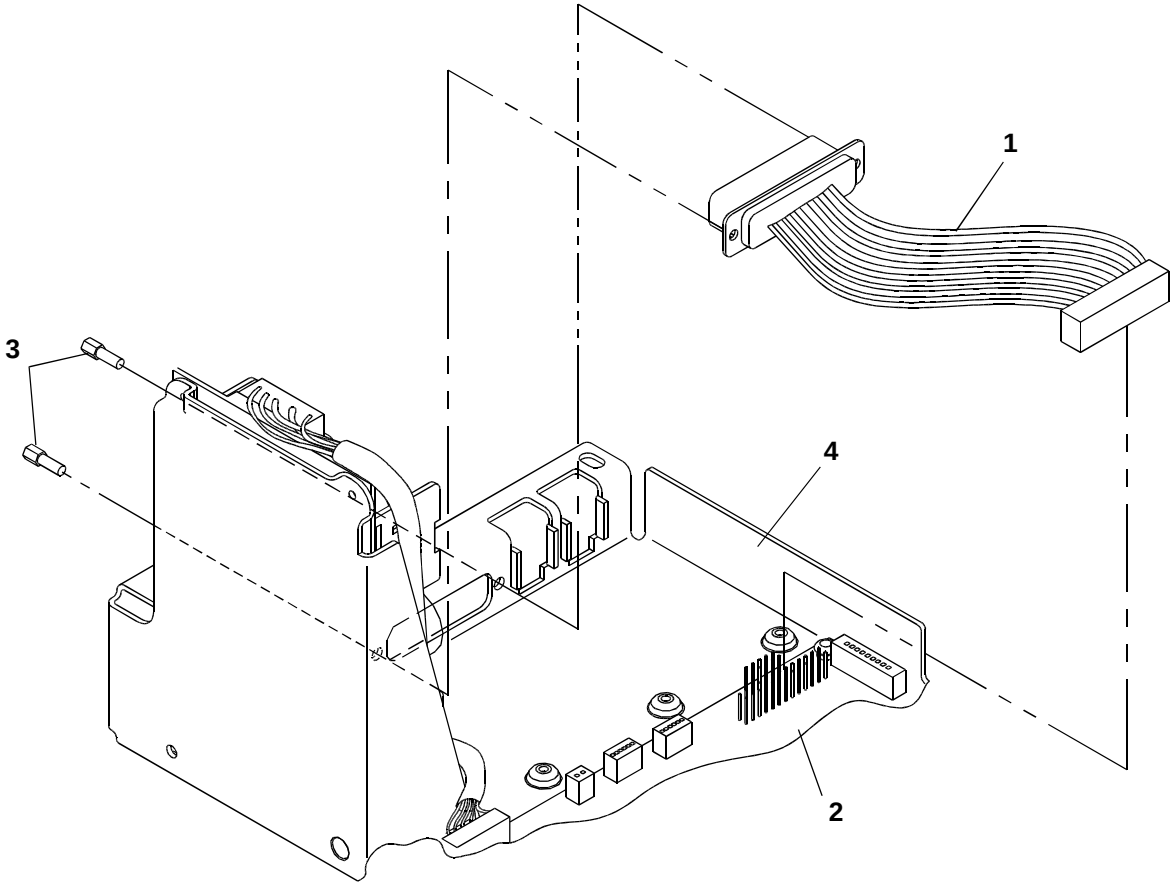


1. Remove the covers (see page 26)

2. Remove the 4 screws (1), 2 in front and 2 in back, holding the mechanical base (2) to the electronics base assembly (3).
3. Lift the mechanical base (2) and disconnect the following harnesses from the controller board assembly (4), cam plate motor harness (6), head cable (5), Slip-in sensor harness (7), paper low sensor harness (8), take-up motor extension harness (9), keypad harness (10), receipt line feed - stepper motor (11). Refer to the chart below for connector locations on the controller board.
4. Remove the slip-in sensor harness (7) and paper low sensor harness (8) from the tab on the left side and tab on the back side of the insulator.
5. Remove the receipt linefeed - stepper motor harness (11) from the tab on the right side of the insulator.

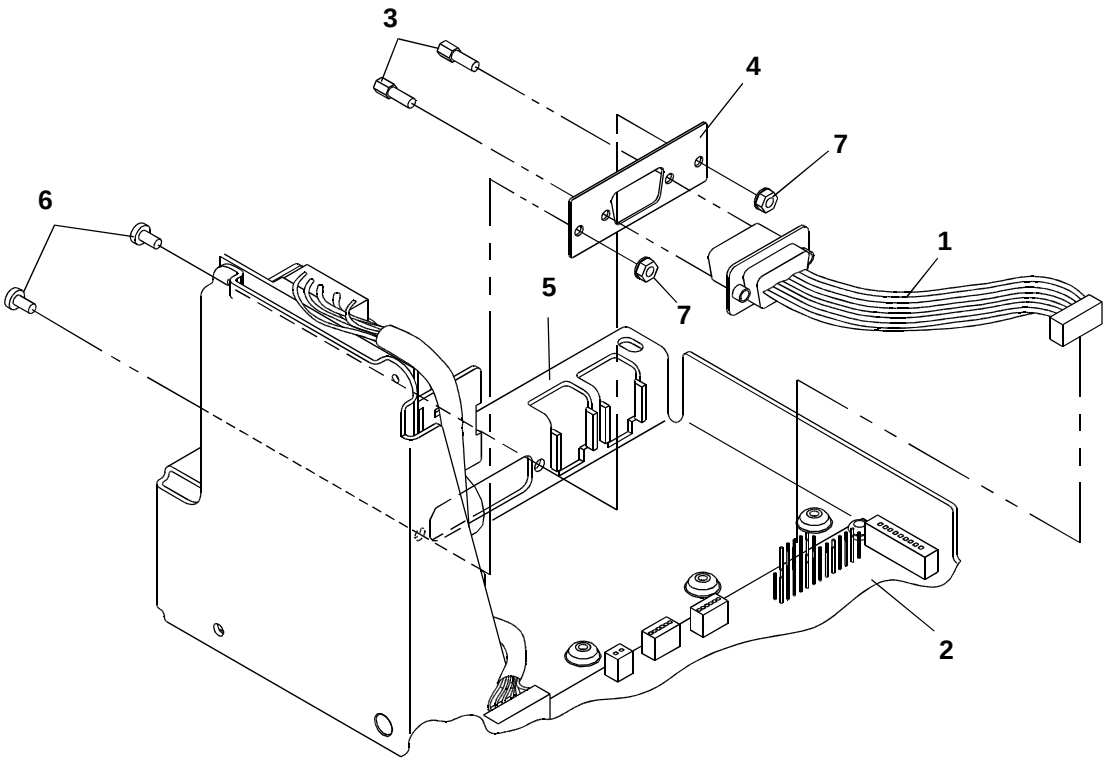
Harness	**Controller Board Location**
Head Cable	CN8
Cam Plate Motor Harness	CN7
Slip-In Sensor Harness	CN9
Paper Low Sensor Harness	CN15
Take-up Motor Extension Harness (Models 92 & 93)	CN4
Keypad Harness	CN5
Receipt Line Feed - Stepper Motor	CN3

25 PIN PARALLEL INTERFACE CABLE



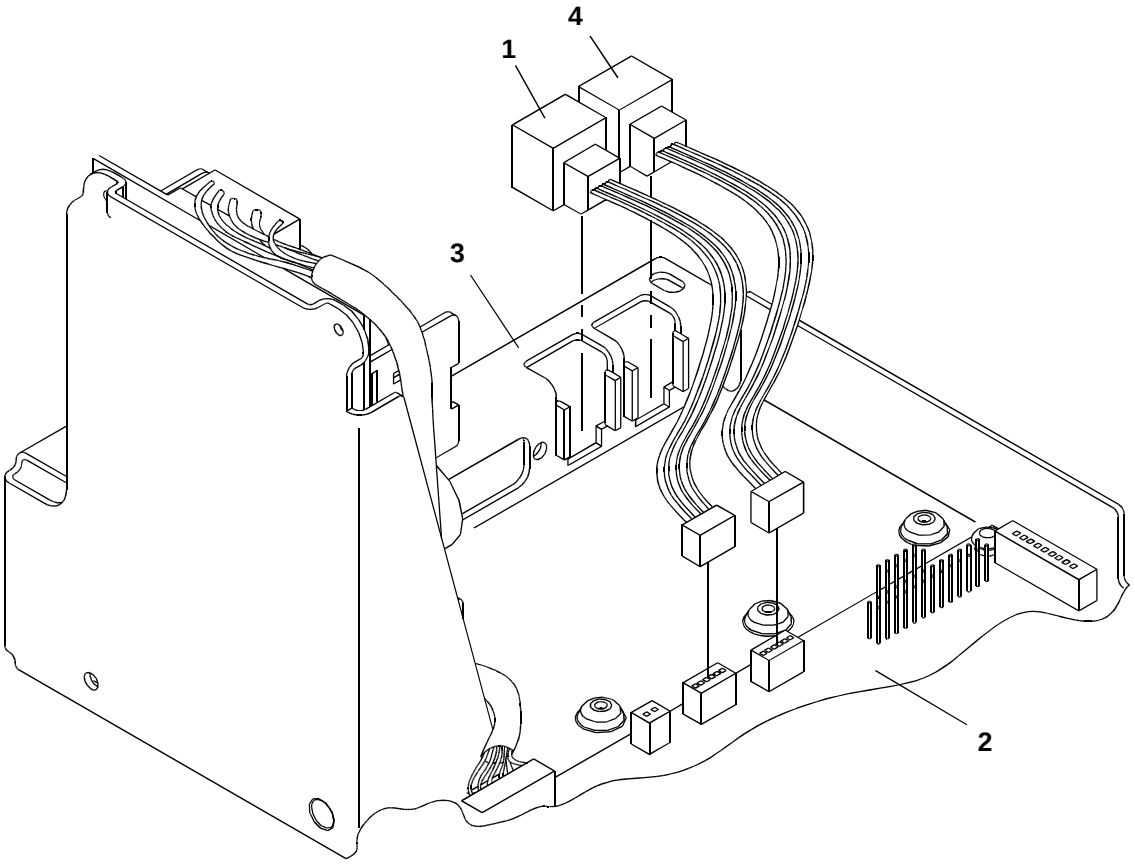
1. Remove the mechanical base assembly (see page 32).
2. Disconnect the 25 pin parallel interface cable (1) from the connector CN13 on the controller board (2).
3. Unscrew the 2 jack screws (3) hold the cable to the electronics base (4).

9 PIN SERIAL INTERFACE CABLE



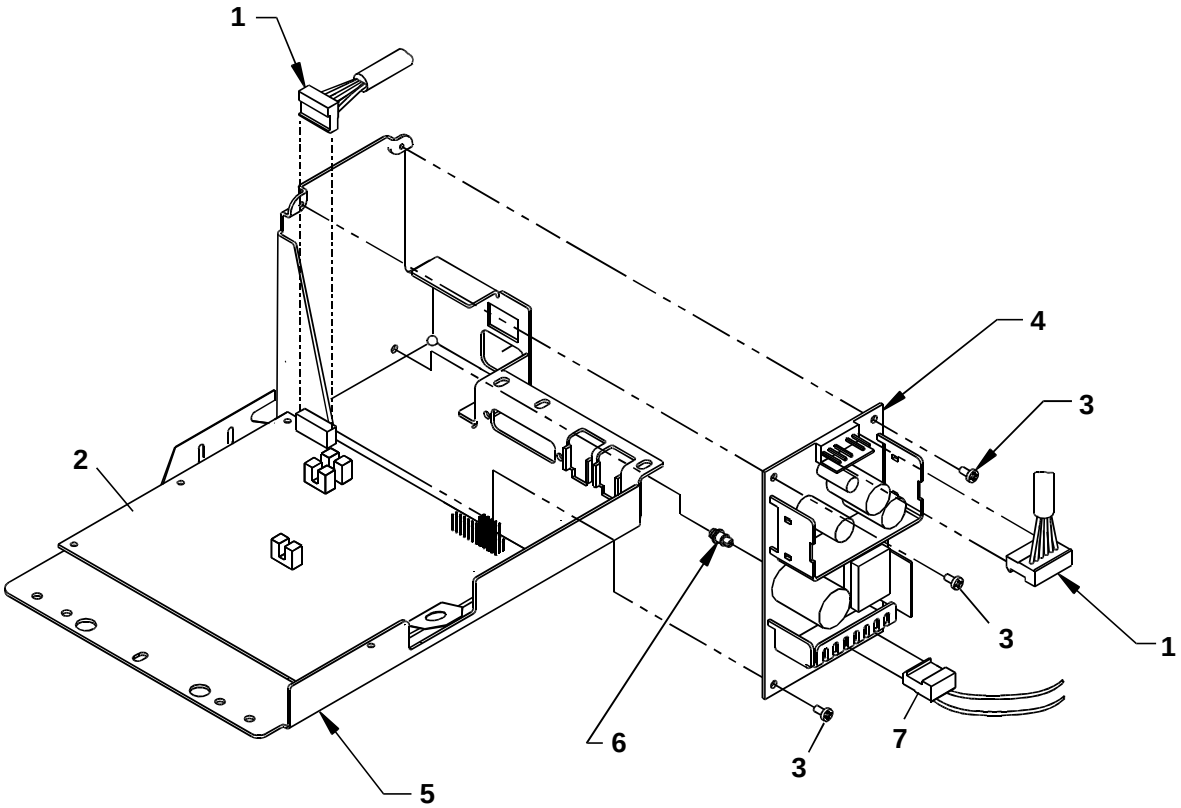
1. Remove the mechanical base assembly (see page 32).
2. Disconnect the 9 pin serial interface cable (1) from the connector CN14 on the controller board (2).
3. Unscrew the 2 jack screws (3) hold the cable to the adapter plate (4).
4. Remove the adapter plate (4) from the electronics base (5) by unscrewing the 2 screws (6) from the 2 nuts (7).

CASH DRAWER HARNESSES



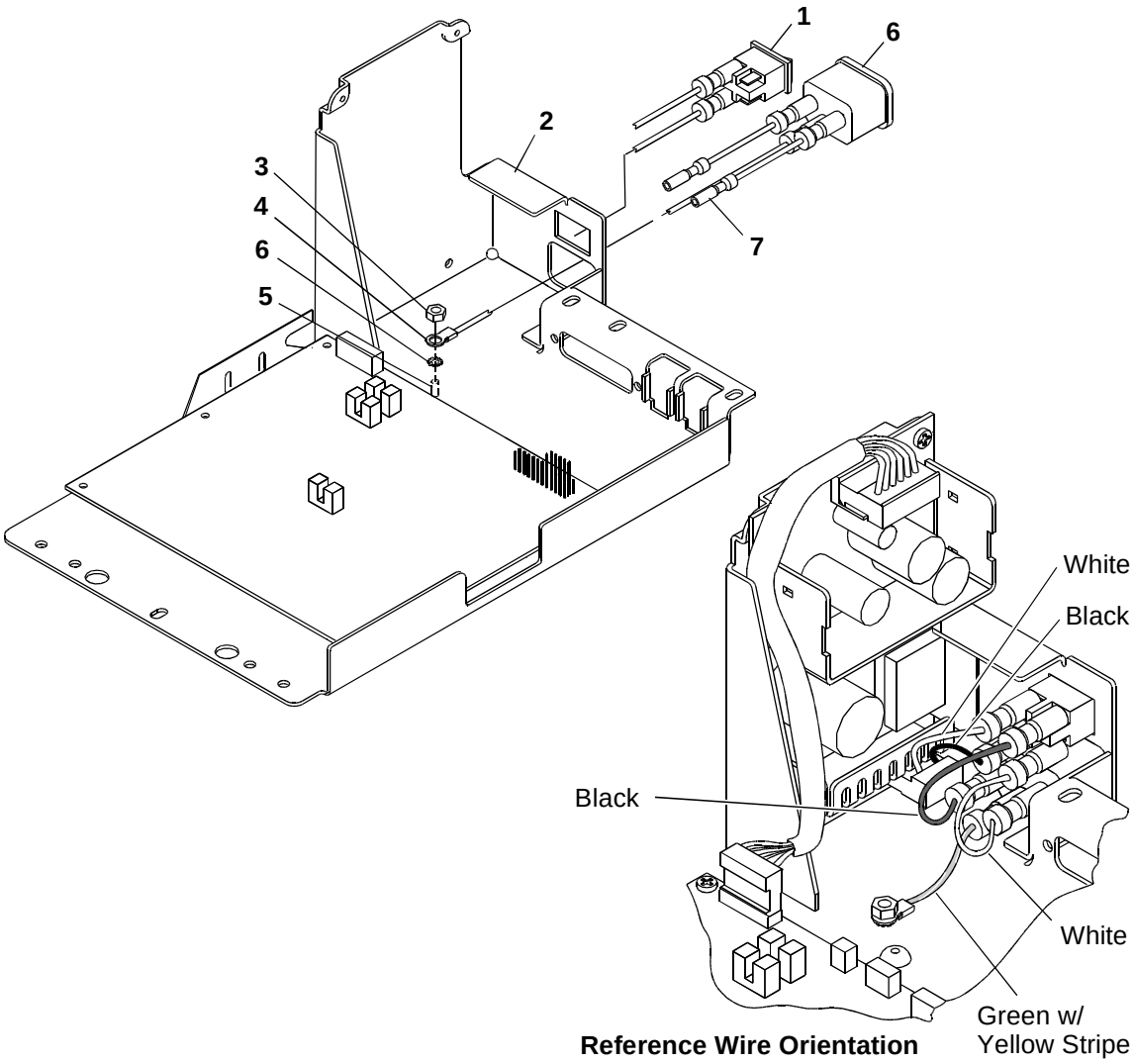
1. Remove the mechanical base assembly (see page 32).
2. Disconnect the cash drawer harness #1 (1) from the connect CN11 on the controller board (2).
3. Pull the harness up and out of the electronics base assembly (3).
4. Disconnect the cash drawer harness #2 (4) from the connect CN12 on the controller board (2).
5. Pull the harness up and out of the electronics base assembly (3).

POWER SUPPLY ASSEMBLY



1. Remove the mechanism base assembly (see page 32).
2. Disconnect the DC power harness (1) from the connector CN10 on the controller board (2).
3. Unscrew the 3 screws (3) holding the power supply (4) to the electronics base (5).
4. Depress and push the power assembly standoff (6) through the side of the electronic base (5).
5. Lift the power supply assembly (4) up and disconnect the power switch harness (7).

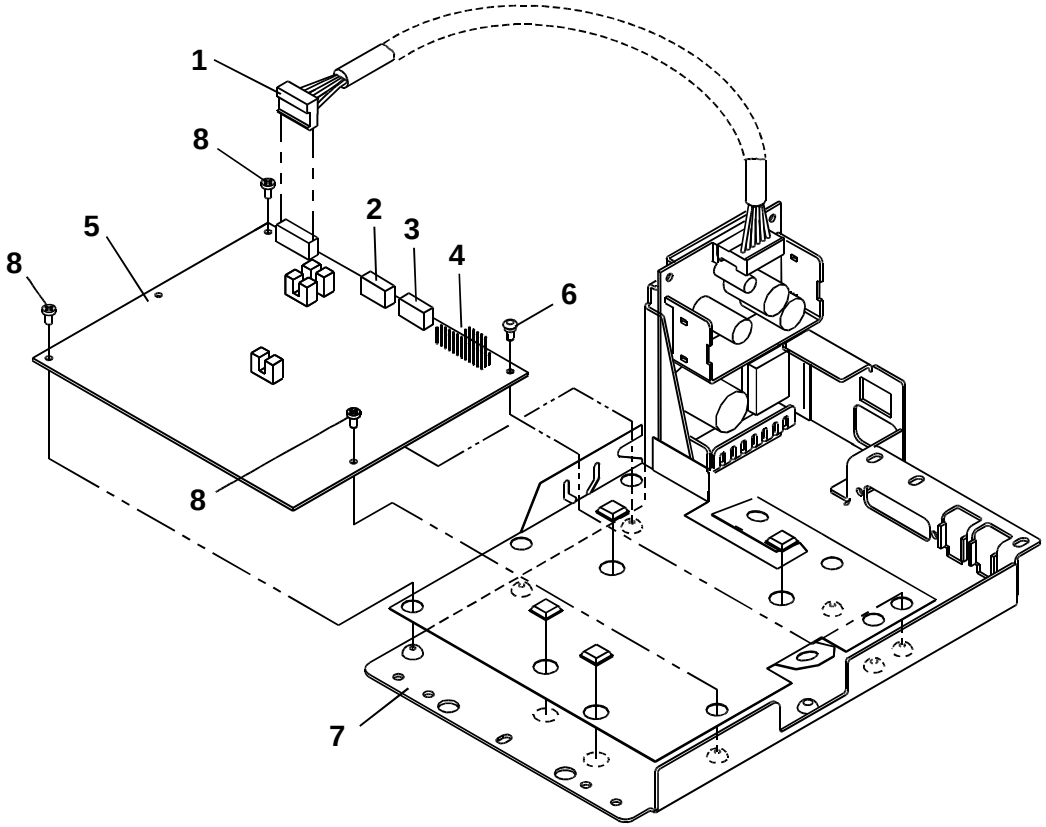
POWER SWITCH AND AC INLET ASSEMBLY



Reference Wire Orientation

1. Remove the Power Supply (see page 37),
2. Unplug the AC inlet assembly wires (7) form the power switch assembly (1).
3. Remove the power switch assembly (1) by squeezing the tabs on the sides of the switch and pushing it out of the electronics base (2).
4. Unscrew the nut (3) holding the ground wire (4) to the stud (5) on the electronics base (2). Remove the lock washer (6) from the stud.
5. Remove the AC inlet assembly (6) by squeezing the tabs on the top and bottom of the assembly.

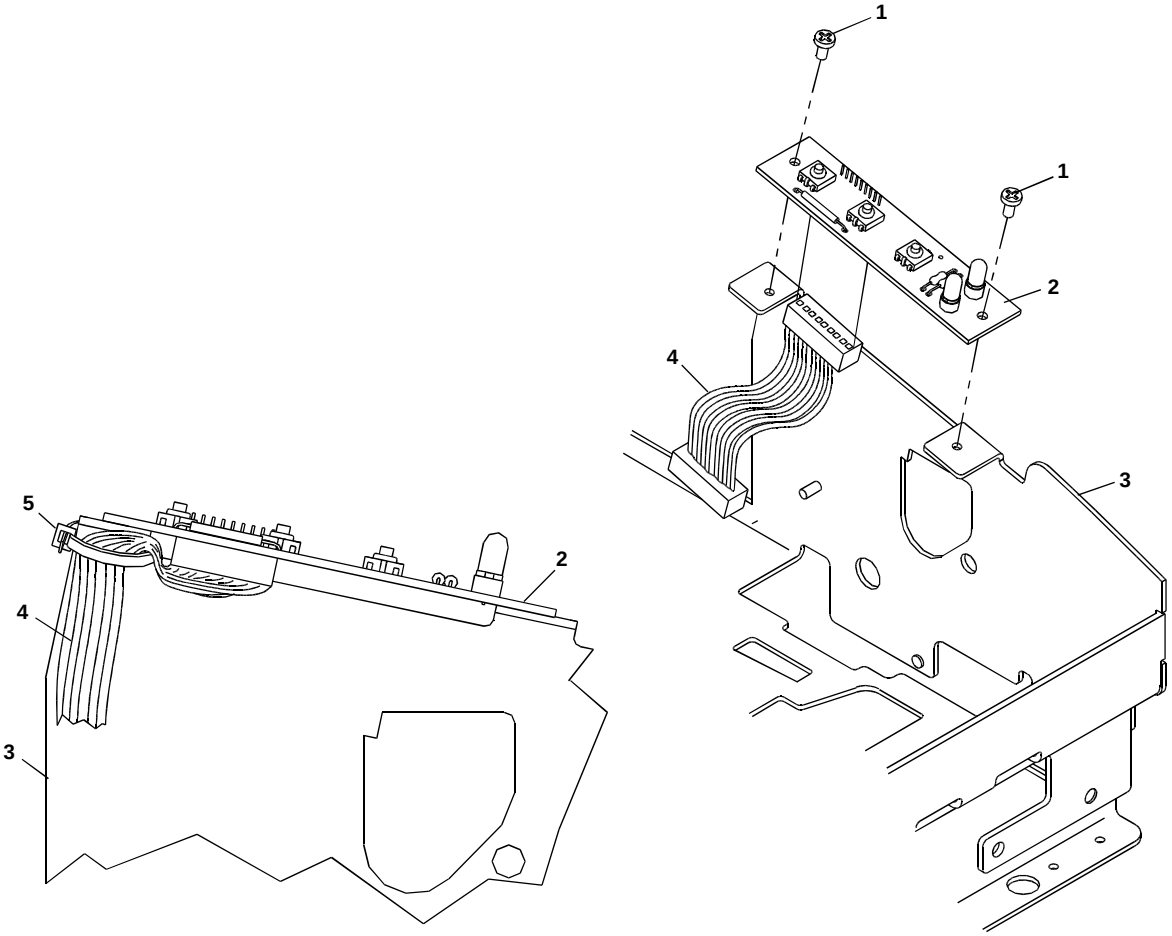
CONTROLLER BOARD ASSEMBLY



1. Remove the mechanism base (see page 32).
2. Disconnect the DC power harness (1), left cash drawer harness (2), right cash drawer harness (3), and the interface cable (4) from the connectors on the controller board (5). See the below chart for locations on the controller board.
3. Remove the snap rivet (6) from the electronic base assembly (7). To remove the snap rivet, locate the snap rivet on the bottom of the electronic base, push the center pin up into the outer jacket, depress the tabs on the outer jacket and push through the electronic base.
4. Remove the 3 screws (8) holding the controller board (5) to the electronic base assembly (7).

Harness	Controller Board Location
DC Power Harness	CN10
Left Cash Drawer Harness (Cash Draw Harness #1)	CN11
Right Cash Drawer Harness (Cash Draw Harness #2)	CN12
Interface Cable (25 Pin Parallel)	CN13
Interface Cable (9 Pin Serial)	CN14

KEYPAD PC BOARD



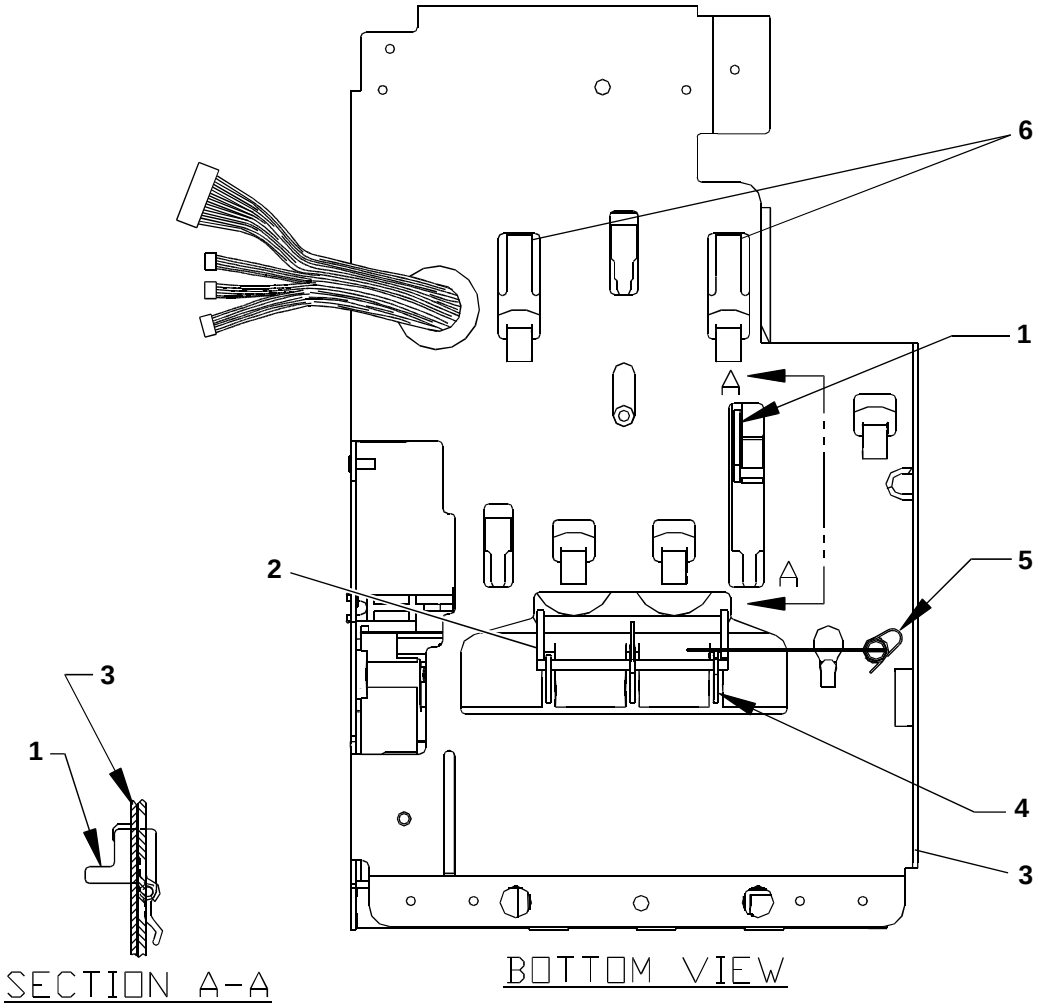
1. Remove the mechanical base assembly (see page 32).
2. Remove the 2 screws (1) holding the keypad PC board (2) to the mechanical base assembly (3).
3. Lift the keypad PC board (2) from the mechanical base assembly (3) and disconnect the keypad harness (4).
4. Cut the Ty wrap (5) to remove the keypad harness (4).

Notes on installation

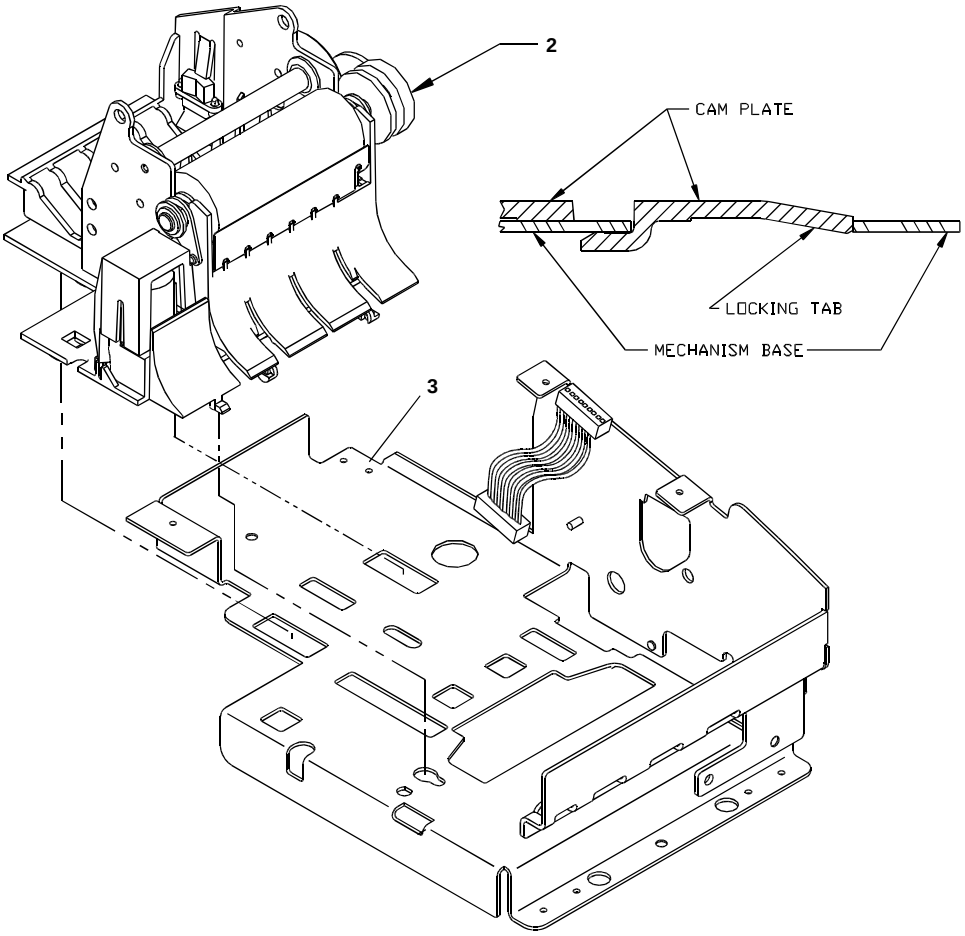
When replacing the Ty wrap (5), the knot and trimmed end should be positioned towards the inside of the base wall.

CARRIER/ CAM PLATE

Model 93 and Model 94 only



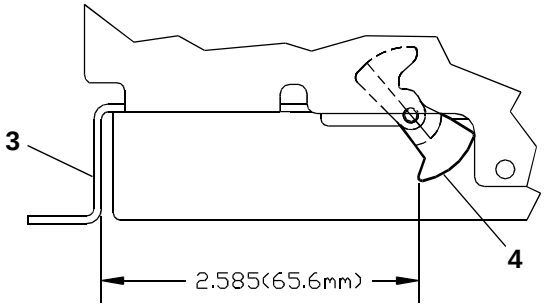
1. Remove the mechanical base assembly (see page 32).
2. Disassemble the cam sensor flag (1) from the carrier/ cam assembly (2), located under the mechanical base assembly (3).
3. Remove the slip stop sensor (4) from the carrier/ cam assembly (2) and slide it off the slip stop sensor spring (5).



4. Release the lock tabs and slide the carrier/ cam assembly (2) backwards until it is released from the mechanical base assembly (3).
5. Carefully pull the cables (6) out of the mechanical base assembly (3).

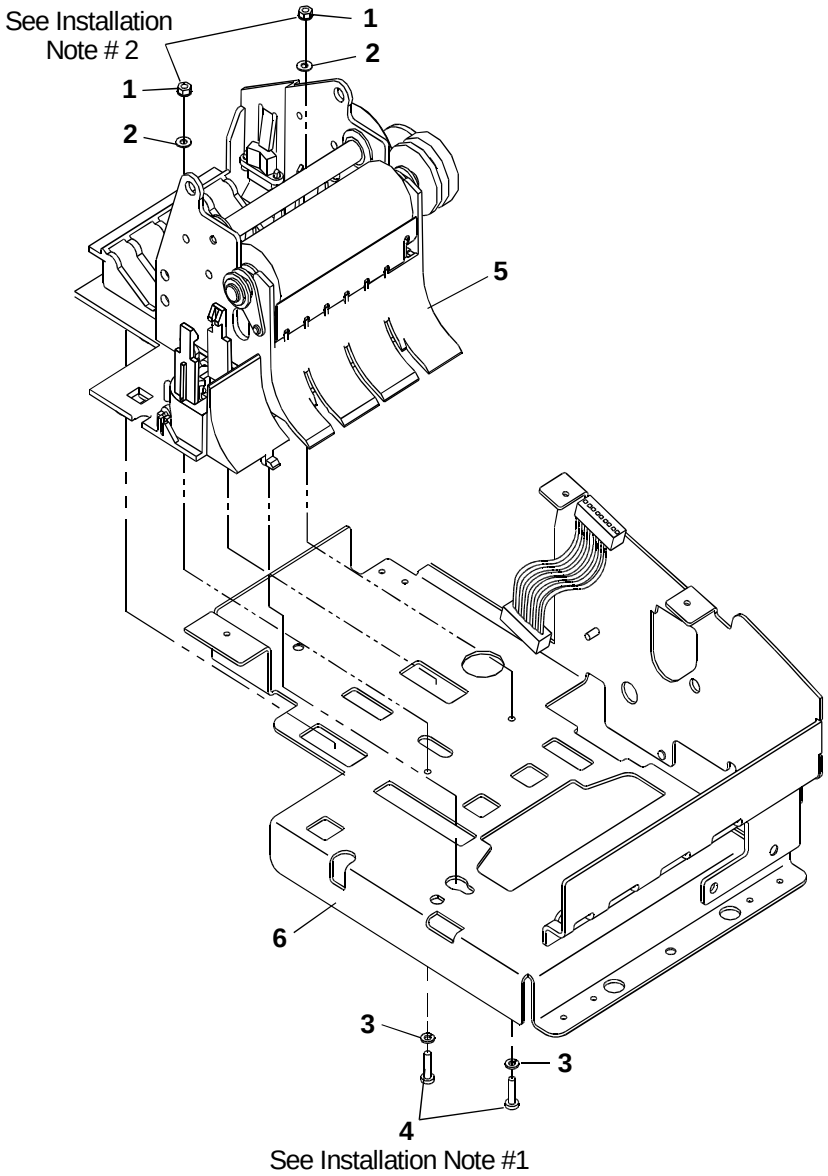
Notes on installation

1. When installing the carrier/ cam assembly (2), position the tabs on the bottom of the carrier/ cam assembly into the slots on the mechanical base assembly (3). Slide the carrier/ cam assembly forward until the two rear tabs lock firmly into the mechanical base assembly.



2. After installing the slip stop sensor (4), adjust the sensor by carefully bending the slip stop sensor spring until the front of the sensor is 2.585 in. (65.6 mm) from the inside wall of the mechanical base assembly (3).

Model 91 and Model 92 only



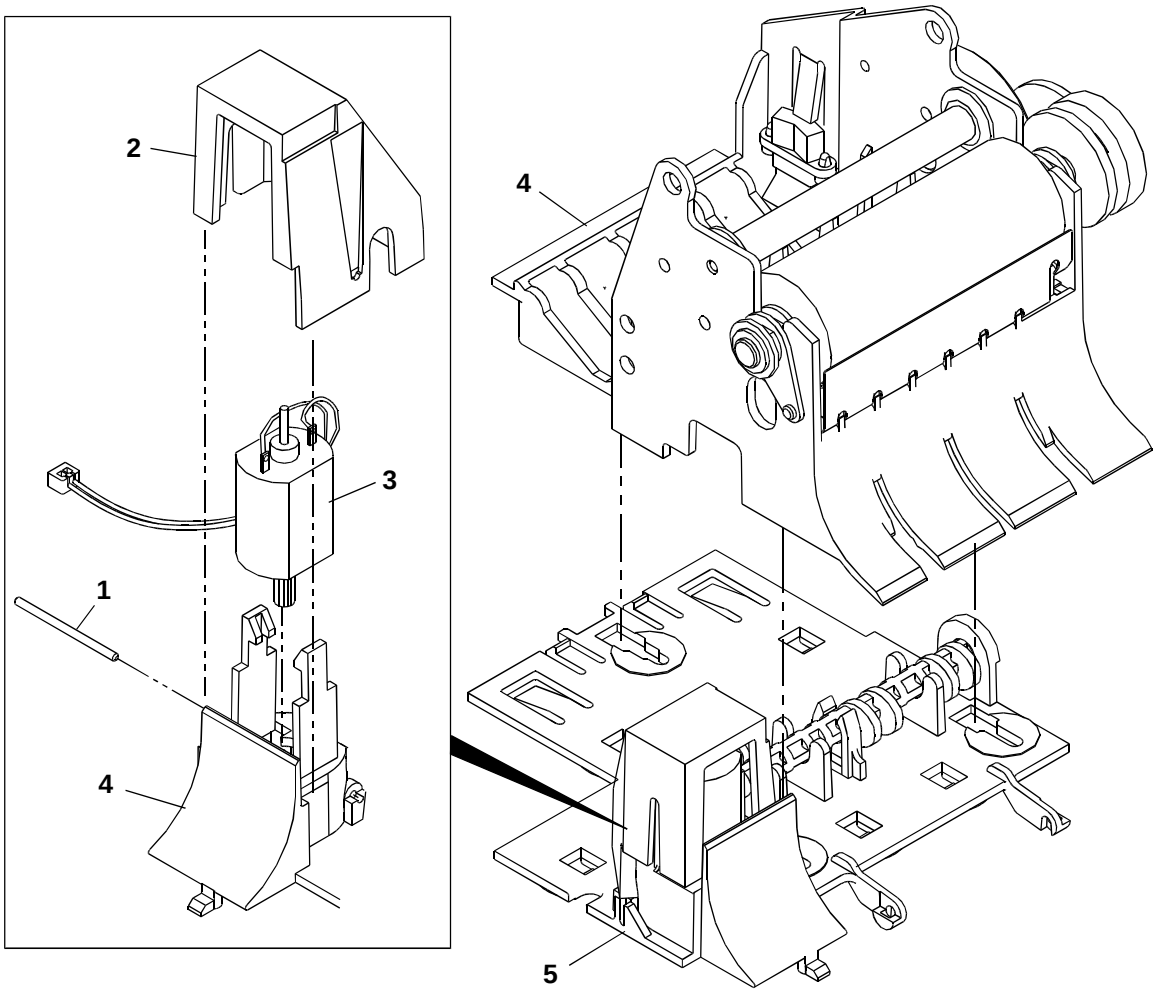
1. Remove the mechanical base (see page 32).
2. Remove the two sets of M3 hex nut (1), flat washer (2), split lock washer (3), and M3x12 mm screw (4) holding the carrier/ cam assembly (5) to the mechanical assembly(6).
3. Release the licking tabs and slide the carrier/ cam assembly (5) backwards until it is released from the base (6).

Notes on installation

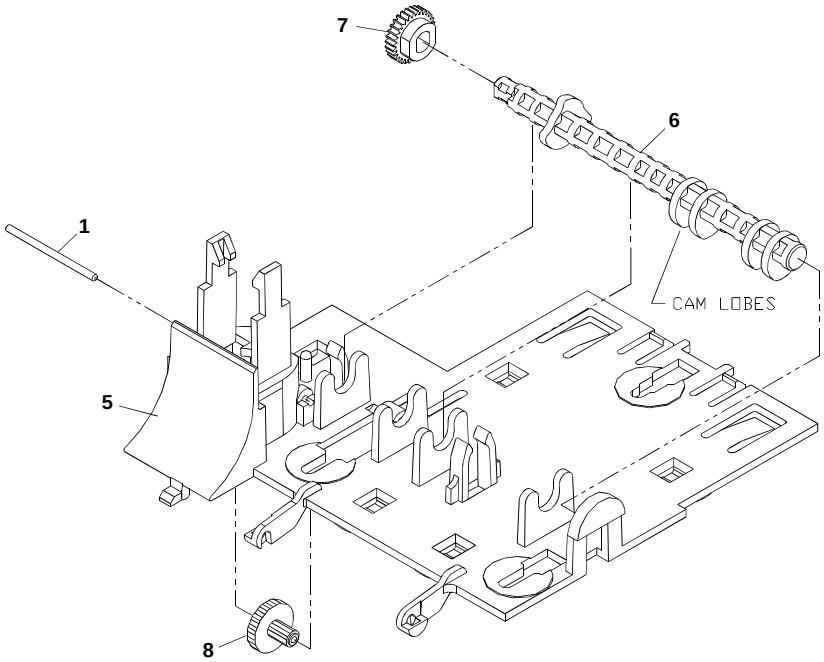
1. Torque screw (4) to 5 ± 1 in./lbs.
2. Torque hex nut (1) to 15 ± 2 in./lbs.

CAM PLATE

Model 93 and 94 Model only

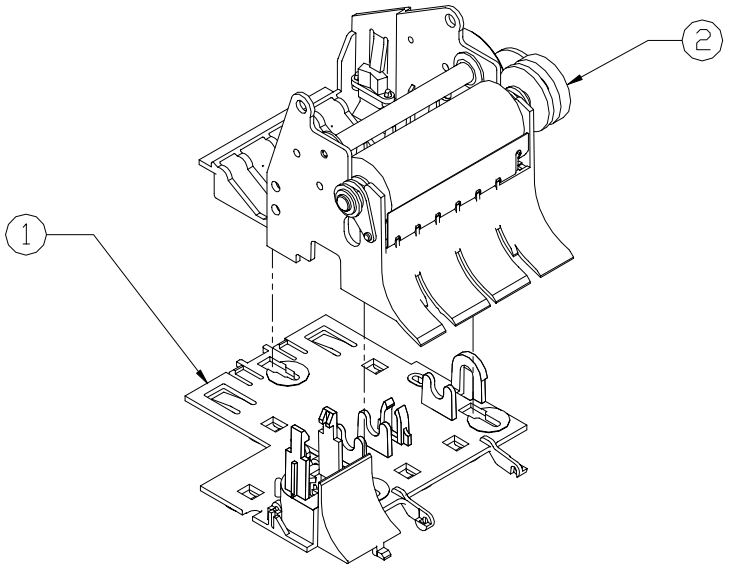


1. Remove the Carrier/ Cam Plate (see page 41).
2. Pull the pin (1) to the left until the motor shroud (2) is freed from the cam plate (5).
3. Separate the tabs and lift out the cam plate motor (3).
4. Slide the carrier assembly (4) backward until is released from the cam plate (5).



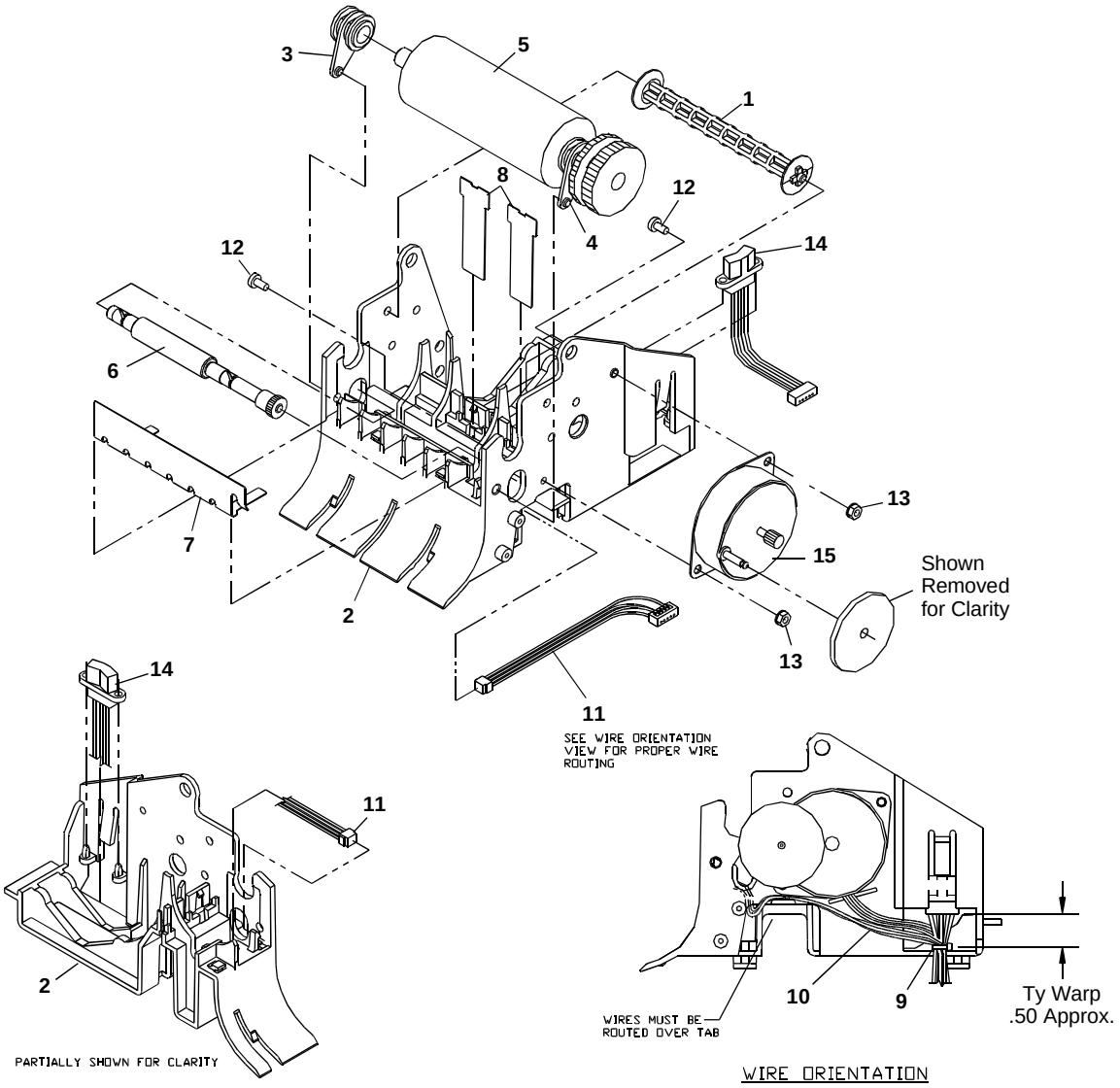
5. Push back on the tab behind the cam shaft (7) and lift the cam shaft out of the cam plate (5).
6. Slide the cam shaft gear (7) off the left end of the cam shaft (7).
7. Slide the pin (2) to the left and remove the compound gear (8).

Model 91 and Model 92



1. Remove the Carrier/ Cam Plate (see page 41).
2. Slide the carrier assembly (1) backward until it is released from the cam plate (2).

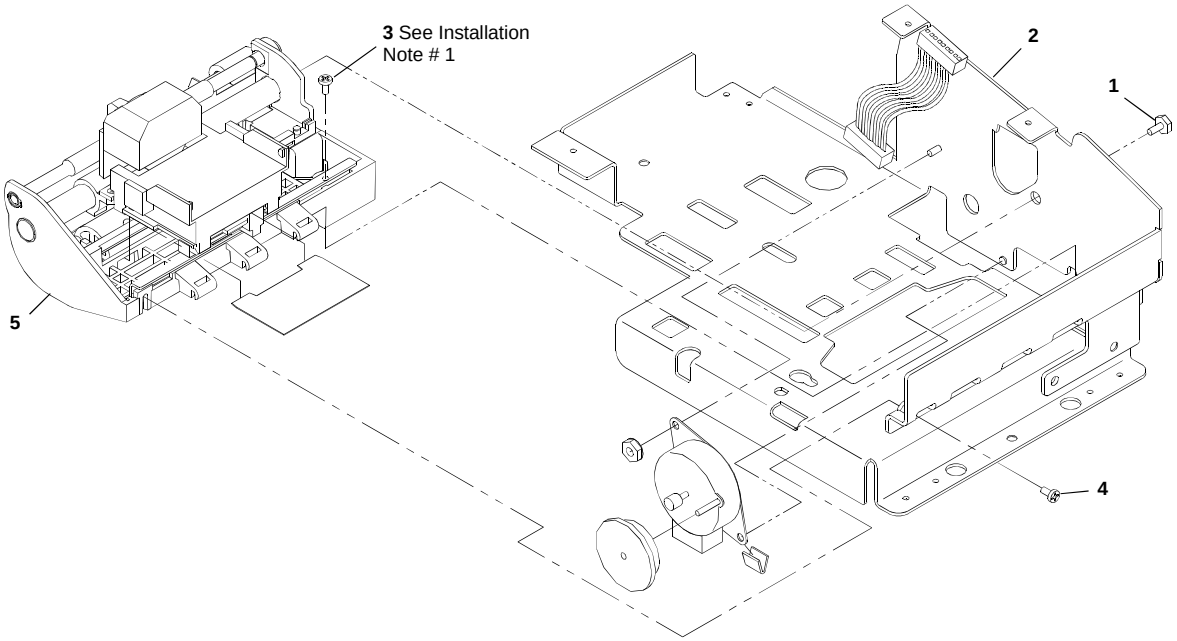
CARRIER ASSEMBLY



1. Remove the Cam Plate (see page 44)

2. Unsnap the receipt roller (1) from the forms comp carrier (2).
3. Rotate the bearings (3 & 4) on each side of the platen assembly (5) forward until it can be lifted out.
4. Remove the left platen bearing (3) from the platen assembly (5).
5. Lift the pressure shaft (6) up and slide it through the hole on the right side of the forms comp carrier (2).
6. Unsnap the spring plate (7) from the forms comp carrier (2).
7. Models 93 and 94 only. Unsnap forms comp springs (8) from the forms comp carrier (2).
8. Cut the Ty wrap (9) securing the motor wires and sensor harnesses (11).
9. Unscrew the 2 screws (12) and 2 hex nuts (13) holding the linefeed motor assembly (15) to the forms comp carrier (2).
10. Unsnap the paper low sensor (14) from the forms comp carrier (2) by pushing the tab to the right.
11. Models 93 and 94 only. Unsnap the forms in sensor (11) assembly from the forms comp carrier (2) and slide out.

REMOVE PRINT MECHANISM ASSEMBLY

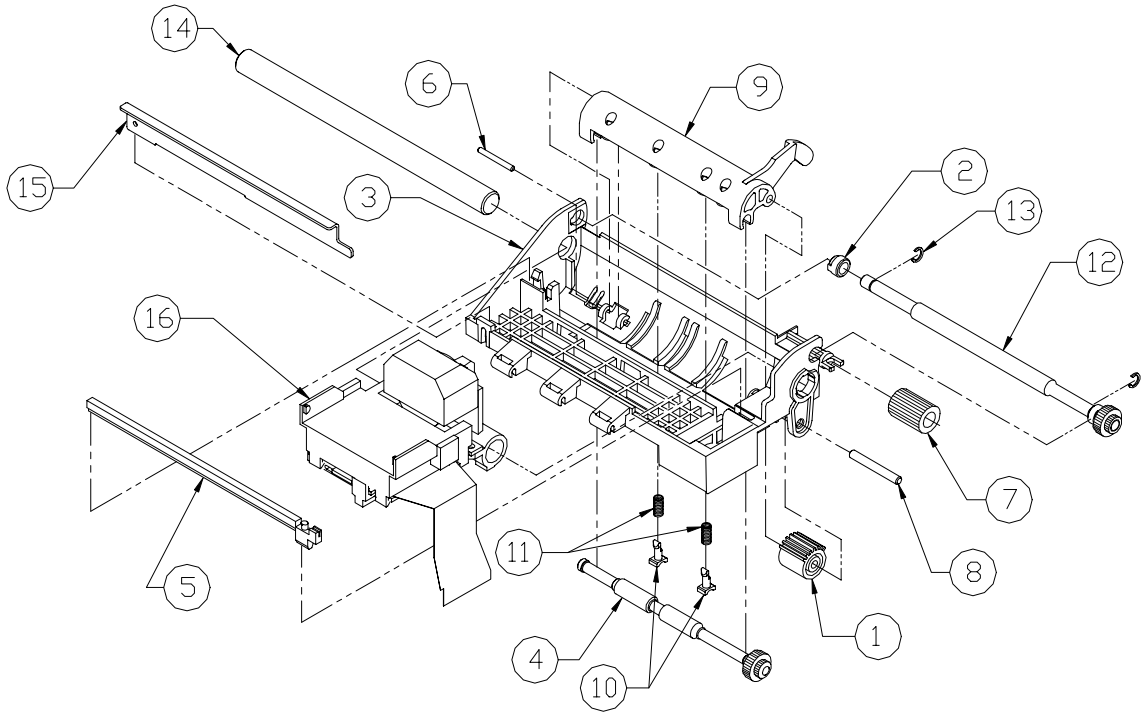


1. Remove the carrier/cam plate (see page 41).
2. Remove the carriage shaft screw (1) from the right side of the base assembly (2).
3. Unscrew the screw (3) holding the print mechanism (5) to the base assembly (4).
4. Unscrew the screw (4) hold the carriage rail to the base assembly (2).
5. Lift the print mechanism out of the base assembly.

Note on installation

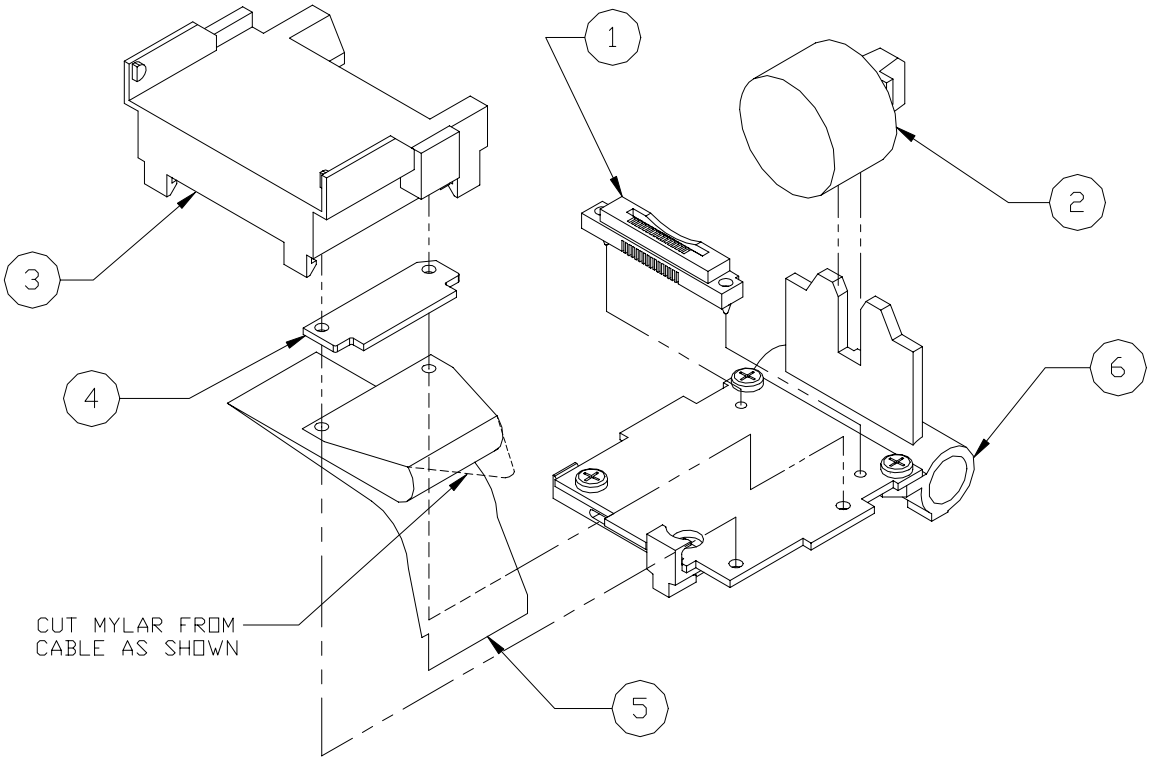
1. When installing screw (3), torque to 5 ± 1 in. lbs.

PRINT MECHANISM ASSEMBLY



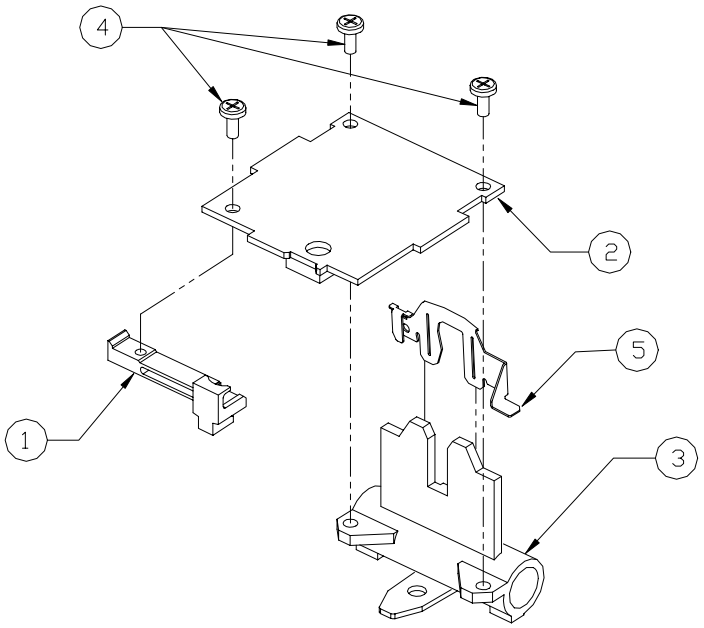
1. Remove the print mechanism assembly (see page 48).
2. Lift the left side of the carriage rail (15) and slide it out of the print mechanism frame (3).
3. Slide the carriage shaft (14) out of the print mechanism frame (3) and carriage assembly (16).
4. Remove the carriage assembly (16). Be careful pulling the ribbon cable out of the frame.
5. Release the tab on the left side of the frame and lift out the space rack (5).
6. Remove the gear (7) from the frame by squeezing the tabs and pushing the gear to the right.
7. Remove the two clips (13) from the validation shaft assembly (12) and slide the validation shaft assembly the right until it is freed from the frame. Slide the feedroll bearing (2) out of the frame.
8. Snap the slip drive shaft (4) out of the actuator (9).
9. Remove the actuator (9) and idler gear (7) by removing the small pin (6) from the left side of the frame and sliding the large pin (8) to the right out of the frame and idler gear.
10. To remove the actuator bearing (10) and actuator compression spring (11) from the actuator, turn the actuator over and while holding the actuator bearing release the tab.

CARRIAGE ASSEMBLY



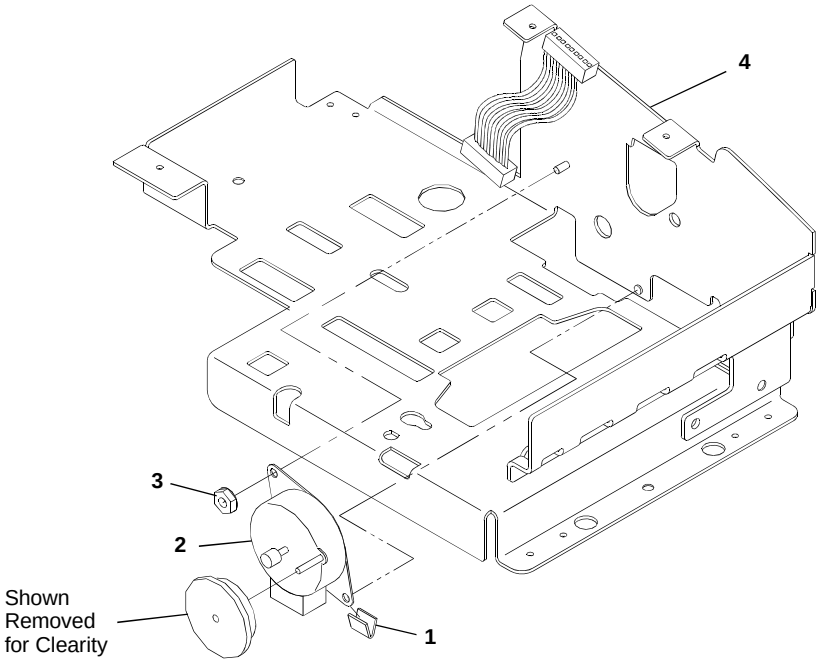
1. Disassemble the print mechanism assembly (see page 49).
2. Remove the printhead (see page 22).
3. Release the four tabs holding the ribbon feed gear assembly (3) to the carriage motor assembly (6). Use caution not to separate the ribbon feed gear assembly parts.
4. Remove the printhead connector (1).
5. Remove the head cable (5) and the rubber pressure contact (4) from the bottom of the ribbon feed gear assembly (3).

CARRIAGE MOTOR



1. Disassemble the carriage assembly (see page 50).
2. To remove the printhead clamp (5), gently pry the back of the clamp over the pin on the back of the carriage roller (3).
3. Remove the front screw (4) and take off the slider (1).
4. Remove the back two screws (4) to separate the spacer motor assembly (2) from the carriage roller (3).

LINEFEED MOTOR



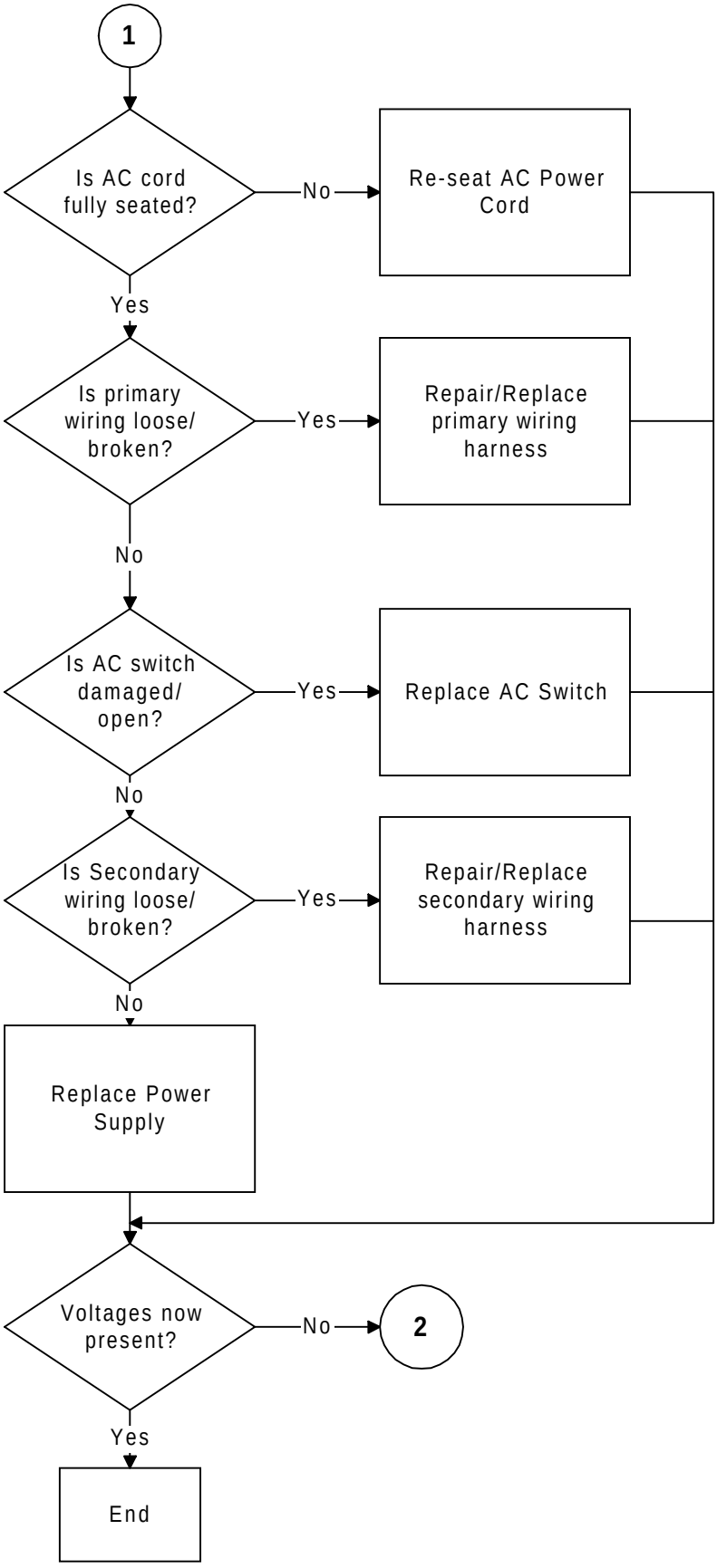
1. Remove the print mechanism assembly (see page 48).
2. Remove the line feed motor (2) by prying off the Tinnerman clip (1) and removing the hex nut holding the motor to the base assembly (4).

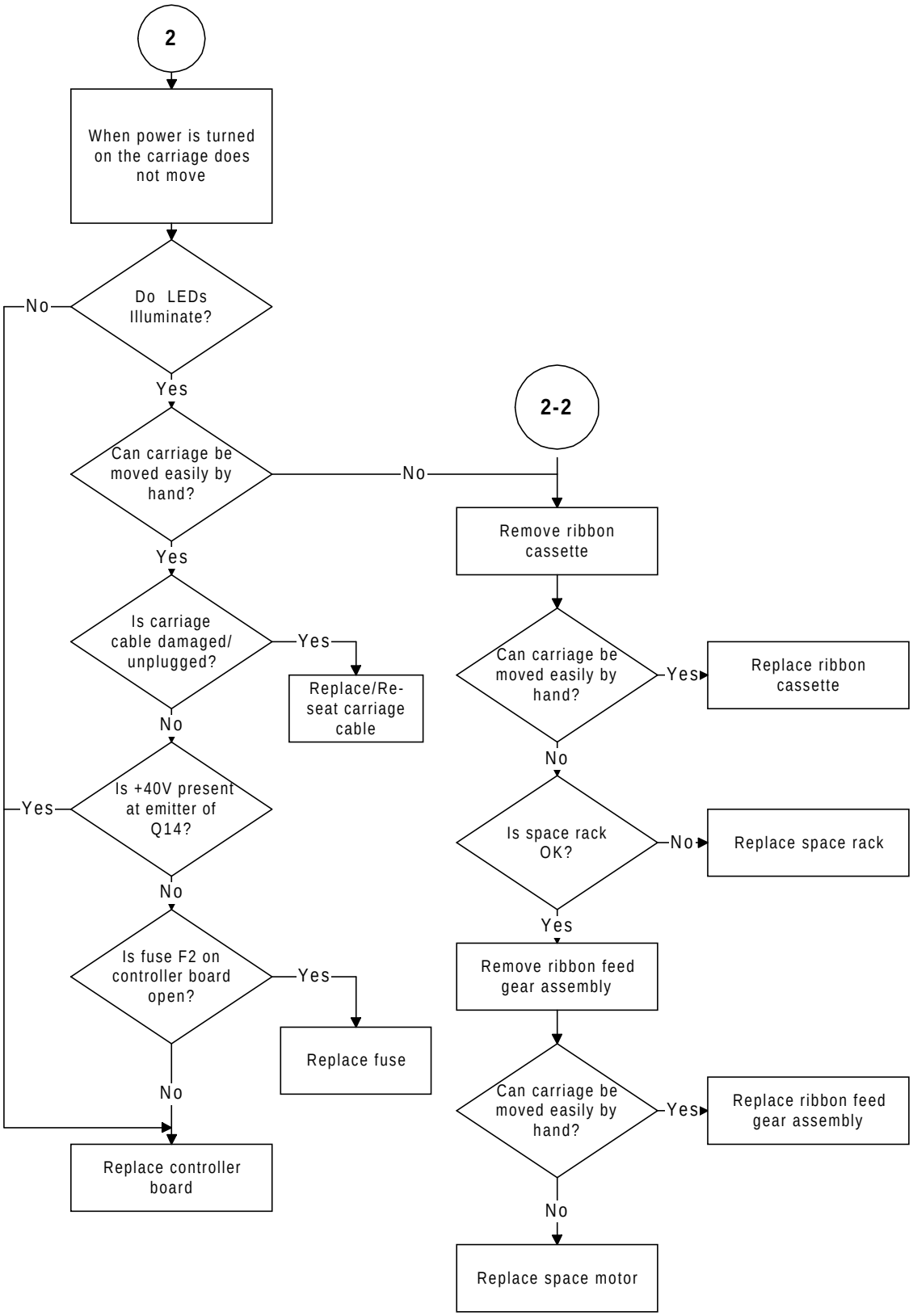
TROUBLESHOOTING

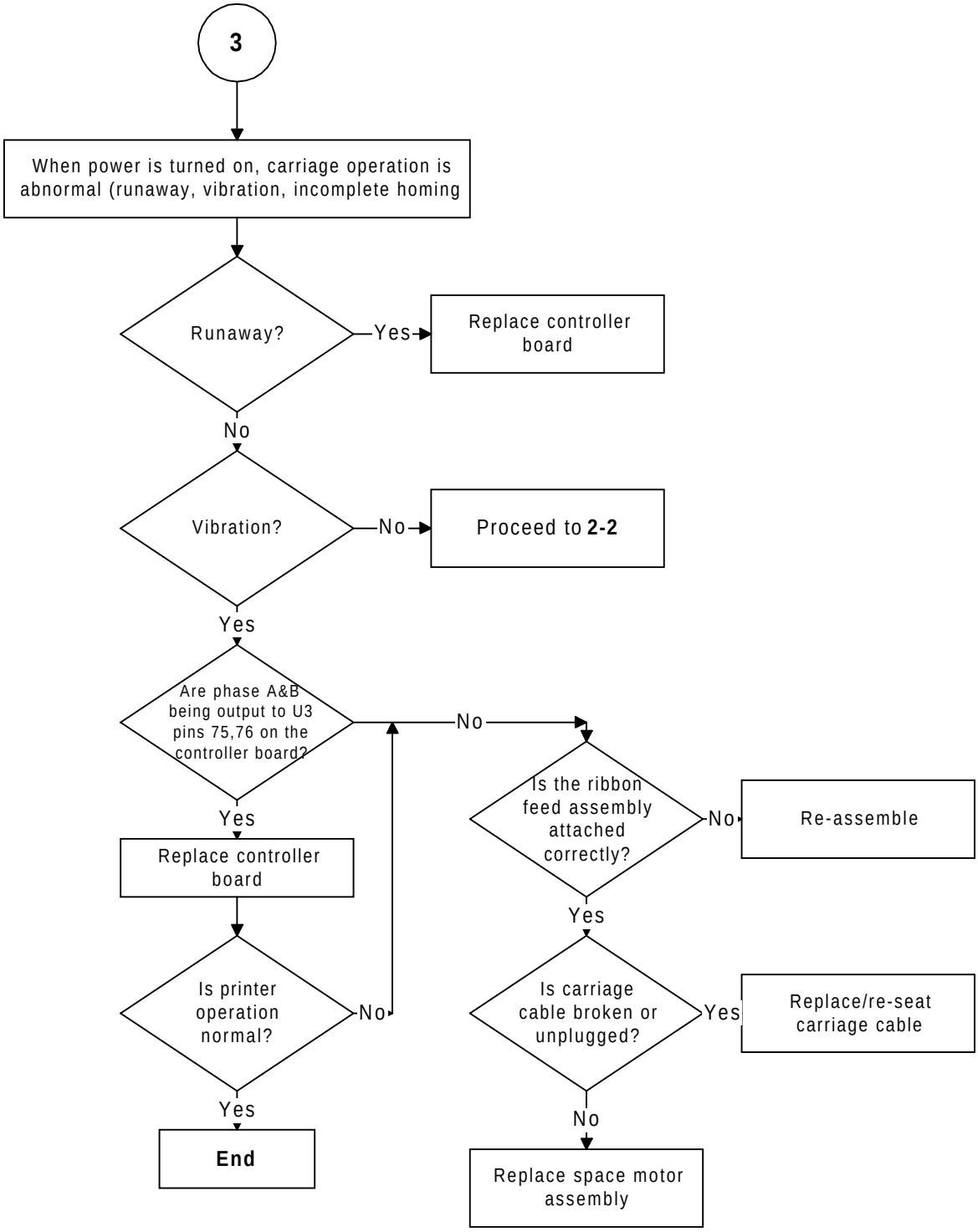
This chapter provides solutions to problems that may occur with the printer. Use the table to determine the problem, then refer to the specified flowchart that describes the corrective action for that problem. The flowcharts are on the following pages and are identified by the number referred to in the table.
Following the flowcharts is a section that describes checking the connection circuits and resistance for the Printhead, Space Motor, and Linefeed Motor.

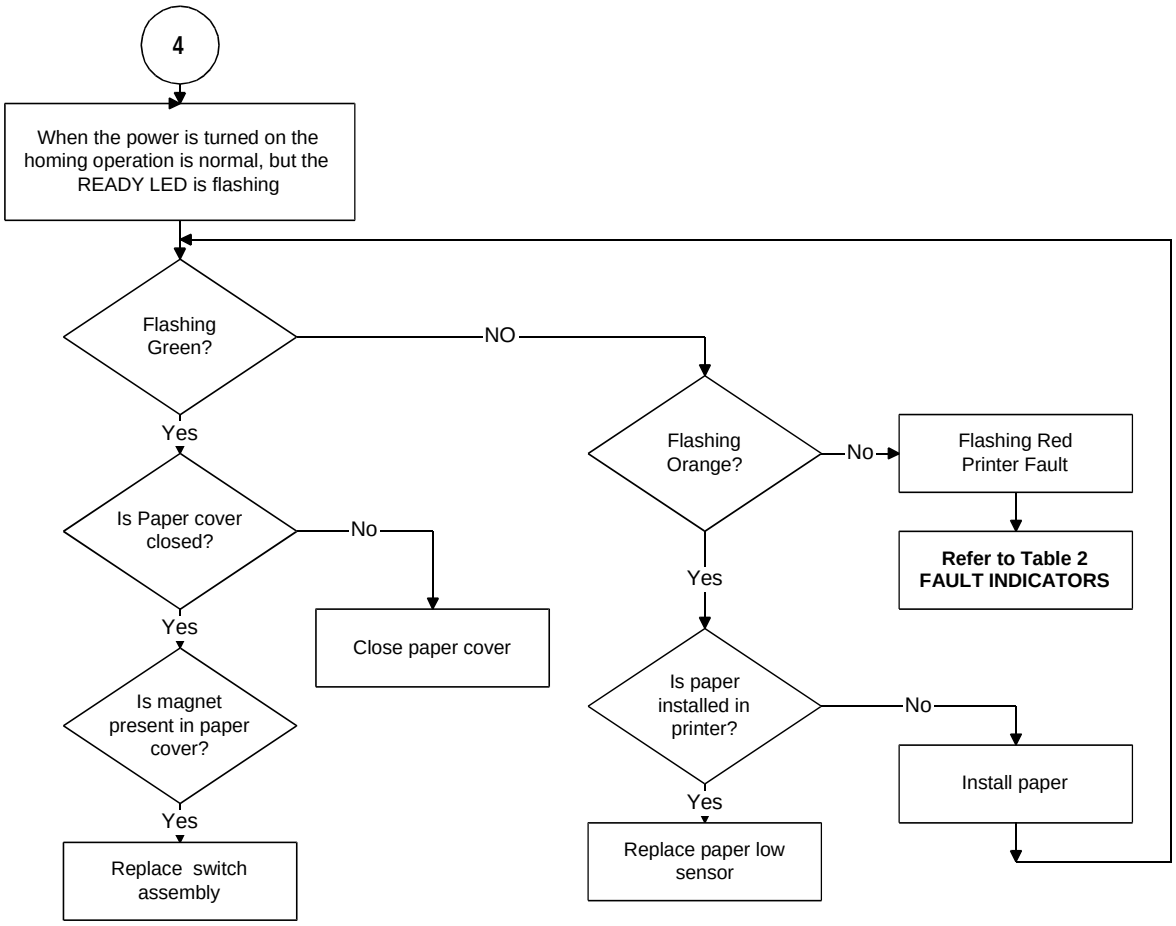
DETERMINING THE PROBLEM

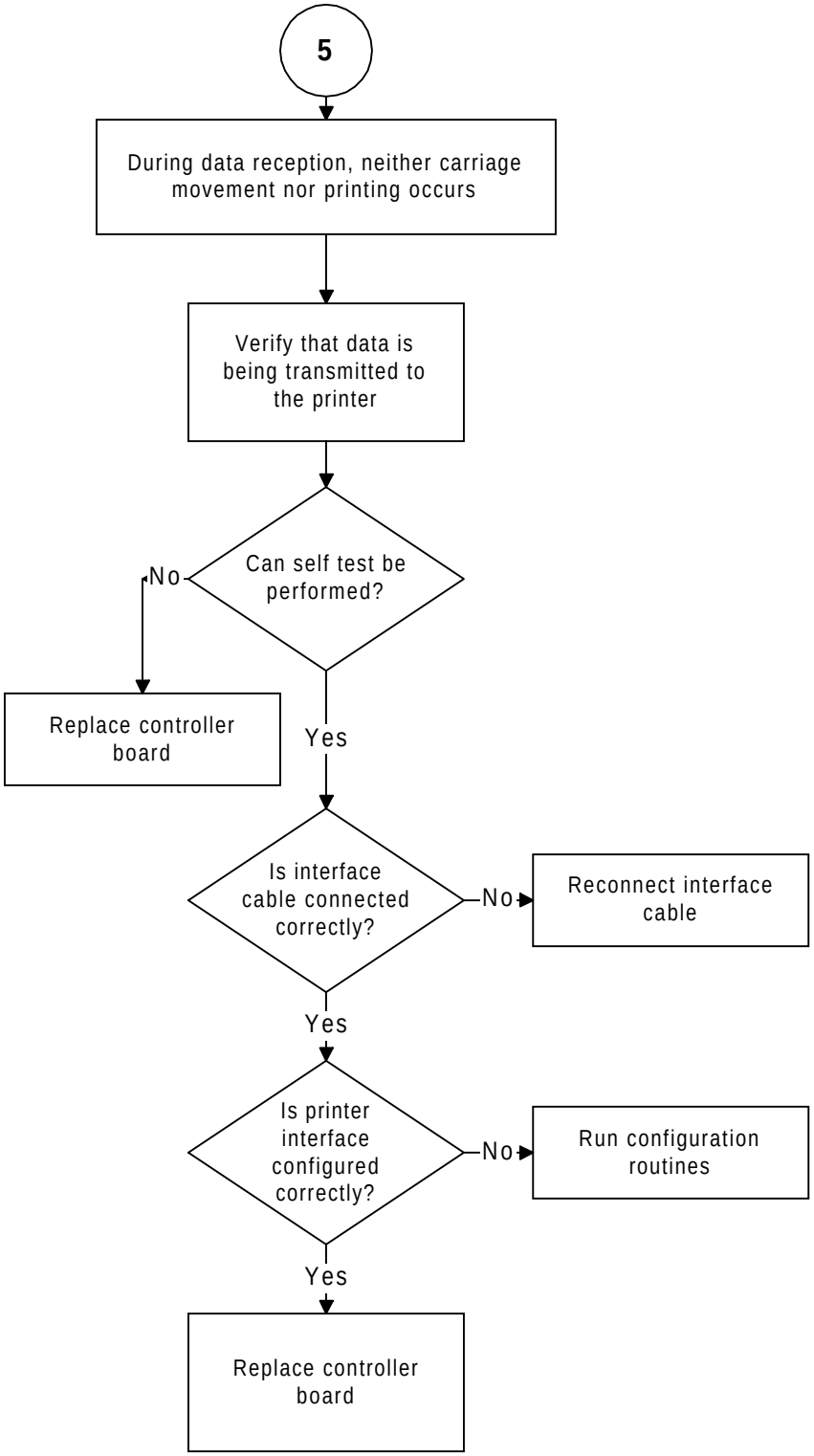
When Problem Occurs	Description of Problem	Refer to Flowchart
Trouble at Power On	Switches or lights do not function on the Keypad and the Carriage does not move	1
	Carriage does not move and power LED is lit	2
	Carriage does not operate normally: runaway, vibration, incomplete homing	3
	Carriage homes normally, but Indicator Display does not operate normally	4
Trouble During Data Reception or Printing	Spacing or printing does not occur	5
	Spacing operates normally, but printer does not print	6
	Printer stops printing	7
	Wrong characters are printed or some characters are not printed	8
	Some dots do not print	9
	Print is not dark enough	10
Forms Handling	Receipt does not line feed	11
	Slip does not line feed	12
	Carrier assembly does not open/close	13
	Front slip load failure	14
	Top validation failure	15

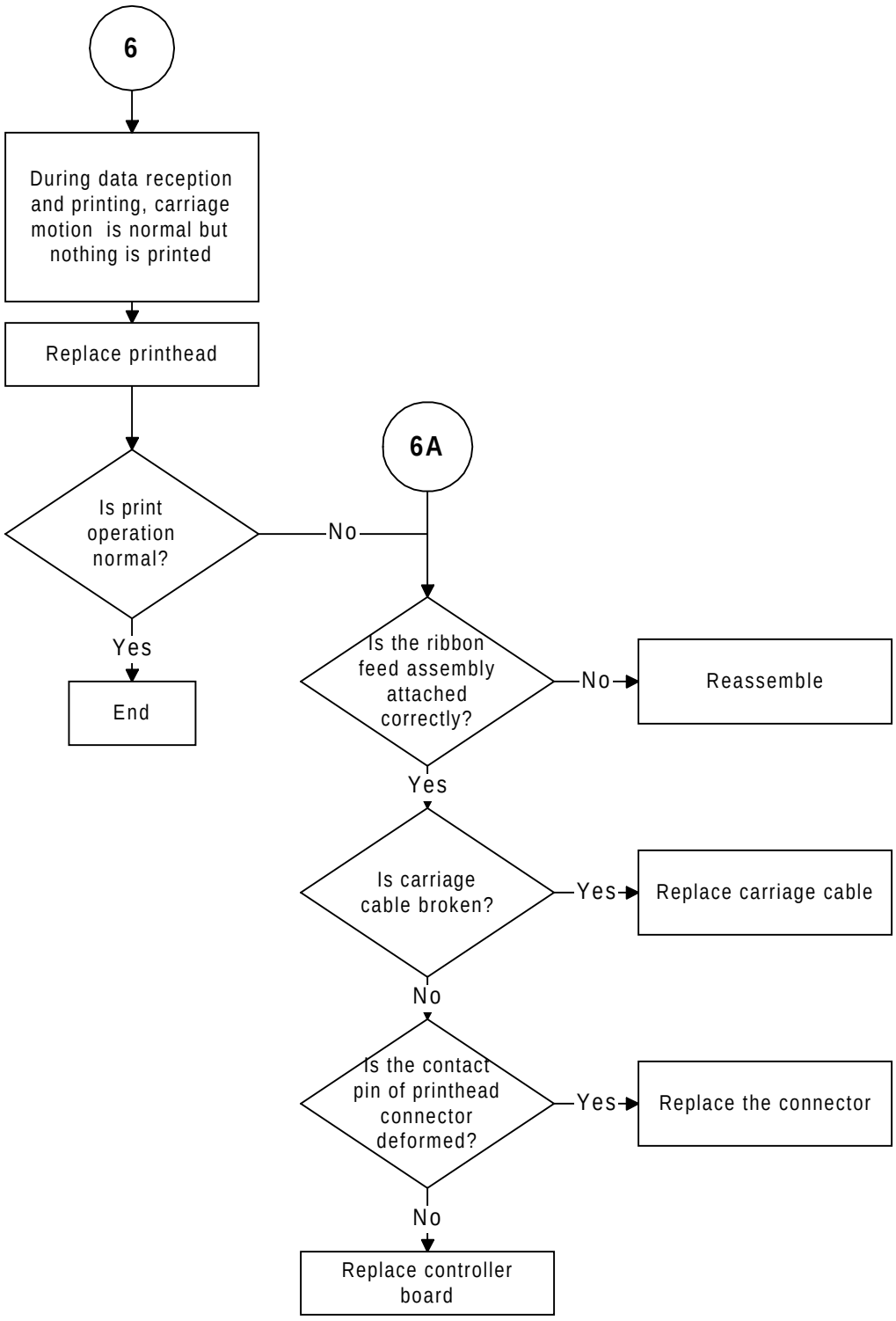

1
Is AC cord fully seated?
No
Re-seat AC Power Cord
Yes
Is primary wiring loose/ broken?
Yes
Repair/Replace primary wiring harness
No
Is AC switch damaged/ open?
Yes
Replace AC Switch
No
Is Secondary wiring loose/ broken?
Yes
Repair/Replace secondary wiring harness
No
Replace Power Supply
Voltages now present?
No
2
Yes
End

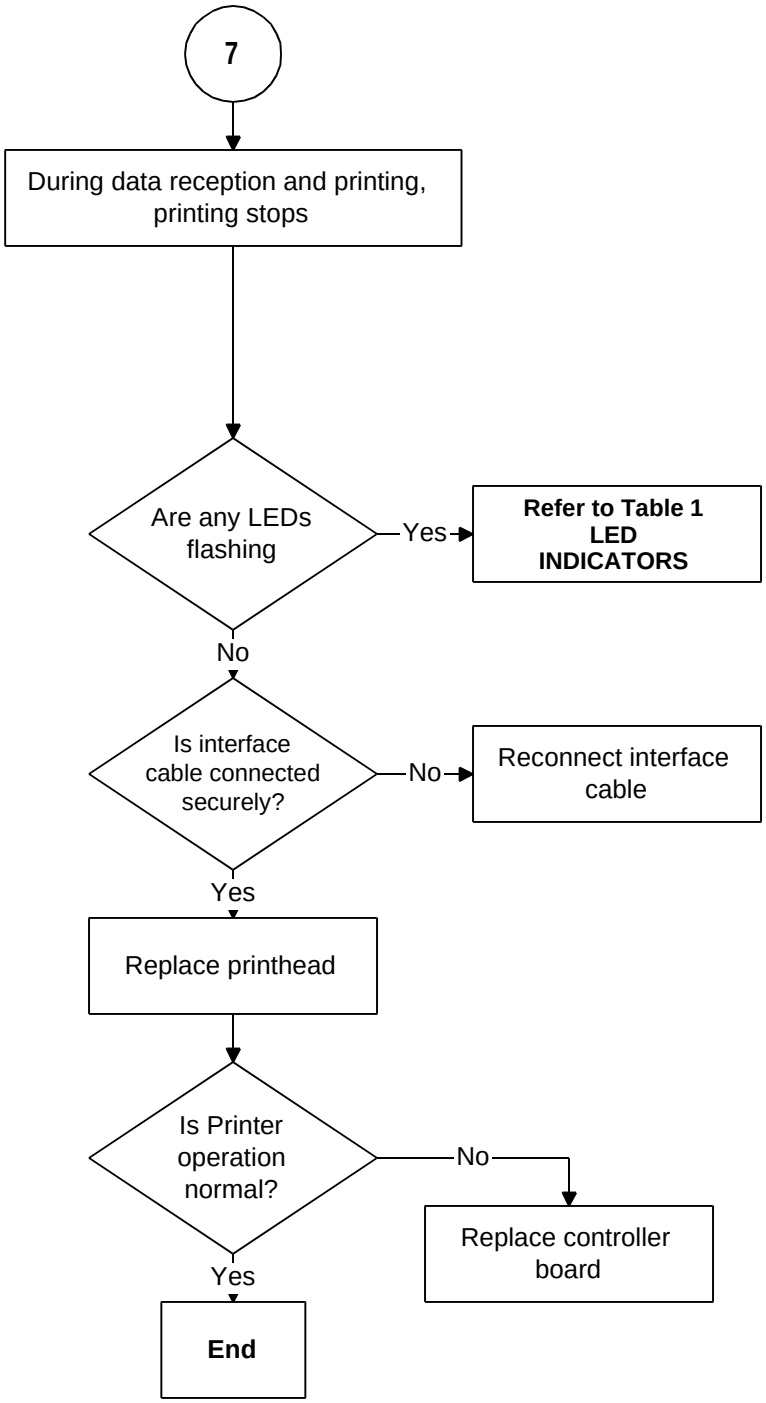

2
When power is turned on the carriage does not move
Do LEDs Illuminate?
No
Yes
Can carriage be moved easily by hand?
No
Yes
Is carriage cable damaged/ unplugged?
Yes
Replace/Re-seat carriage cable
No
Is +40V present at emitter of Q14?
Yes
No
Is fuse F2 on controller board open?
Yes
Replace fuse
No
Replace controller board
2-2
Remove ribbon cassette
Can carriage be moved easily by hand?
Yes
Replace ribbon cassette
No
Is space rack OK?
No
Replace space rack
Yes
Remove ribbon feed gear assembly
Can carriage be moved easily by hand?
Yes
Replace ribbon feed gear assembly
No
Replace space motor

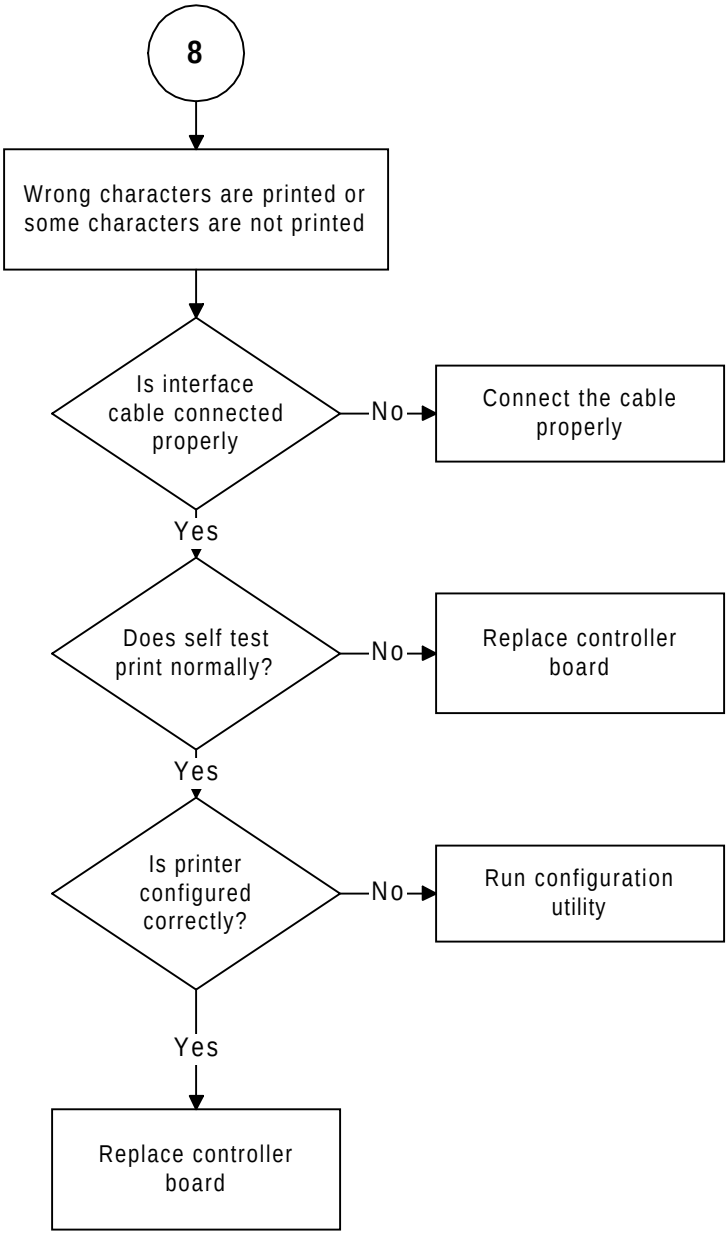

3
When power is turned on, carriage operation is abnormal (runaway, vibration, incomplete homing
Runaway?
Yes
Replace controller board
No
Vibration?
No
Proceed to 2-2
Yes
Are phase A&B being output to U3 pins 75,76 on the controller board?
No
Yes
Replace controller board
Is printer operation normal?
No
Yes
End
Is the ribbon feed assembly attached correctly?
No
Re-assemble
Yes
Is carriage cable broken or unplugged?
Yes
Replace/re-seat carriage cable
No
Replace space motor assembly

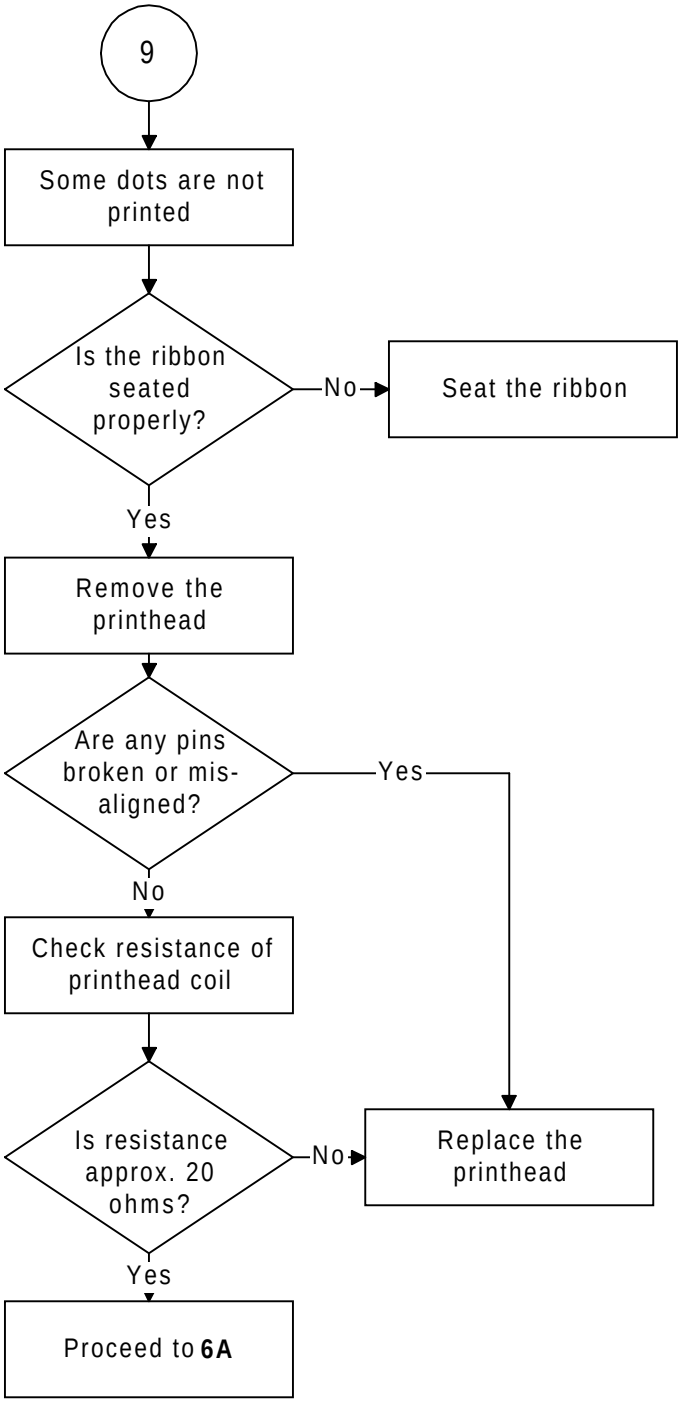

4
When the power is turned on the homing operation is normal, but the READY LED is flashing
Flashing Green?
NO
Yes
Is Paper cover closed?
No
Close paper cover
Yes
Is magnet present in paper cover?
Yes
Replace switch assembly
Flashing Orange?
No
Flashing Red Printer Fault
Refer to Table 2 FAULT INDICATORS
Yes
Is paper installed in printer?
No
Install paper
Yes
Replace paper low sensor

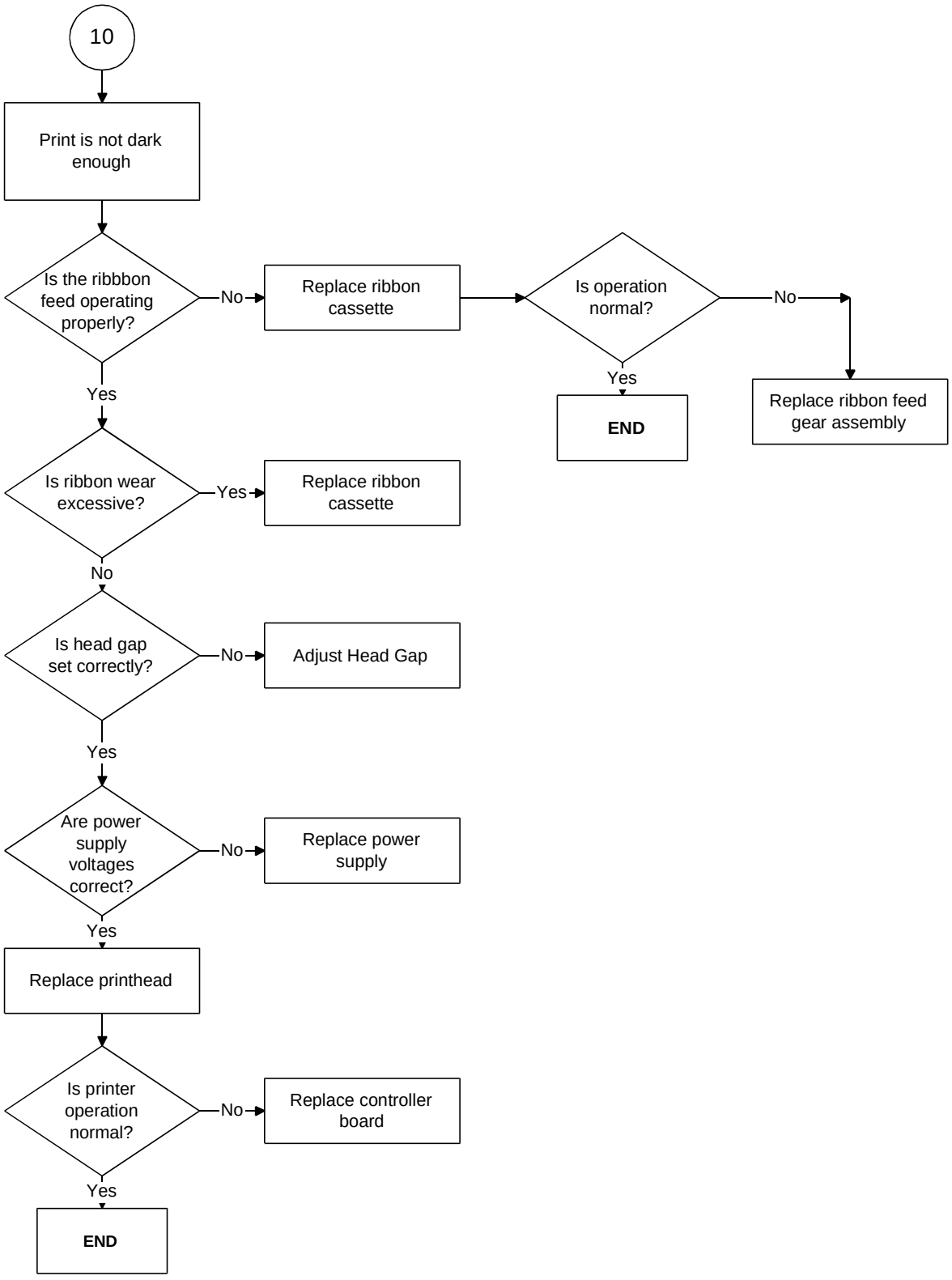

5
During data reception, neither carriage movement nor printing occurs
Verify that data is being transmitted to the printer
Can self test be performed?
No
Replace controller board
Yes
Is interface cable connected correctly?
No
Reconnect interface cable
Yes
Is printer interface configured correctly?
No
Run configuration routines
Yes
Replace controller board

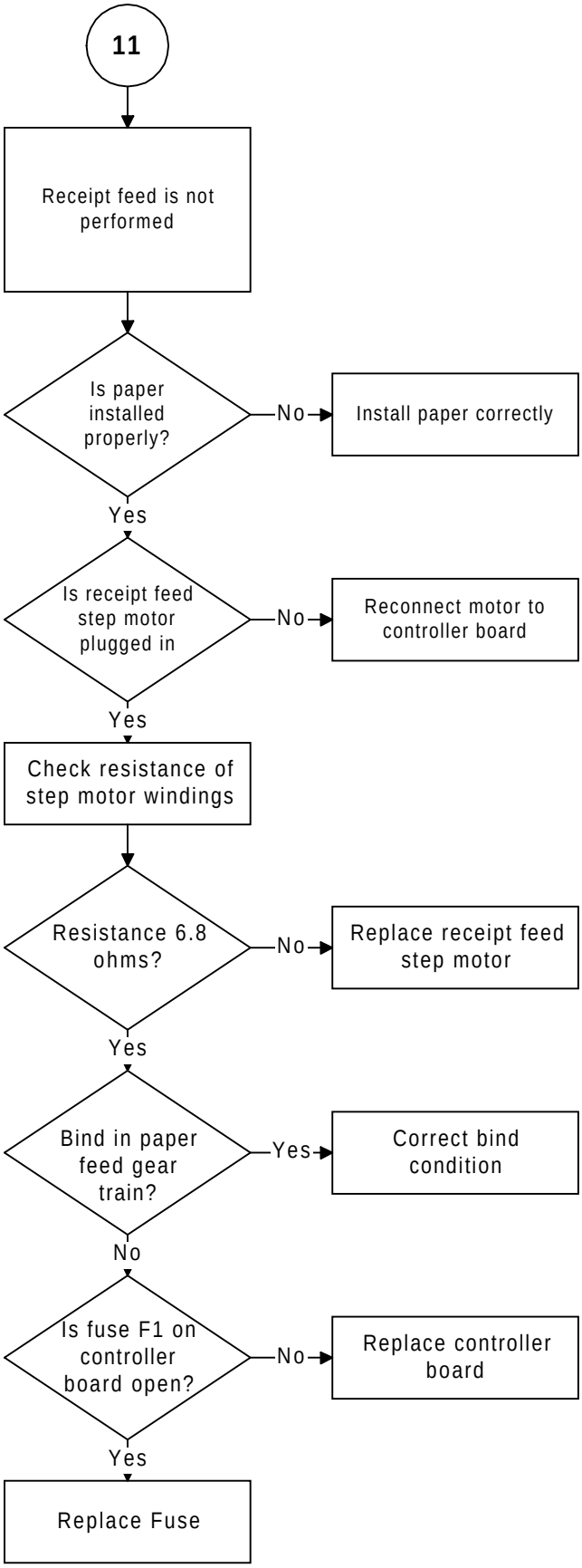

6
During data reception and printing, carriage motion is normal but nothing is printed
Replace printhead
Is print operation normal?
No
Yes
End
6A
Is the ribbon feed assembly attached correctly?
No
Reassemble
Yes
Is carriage cable broken?
Yes
Replace carriage cable
No
Is the contact pin of printhead connector deformed?
Yes
Replace the connector
No
Replace controller board

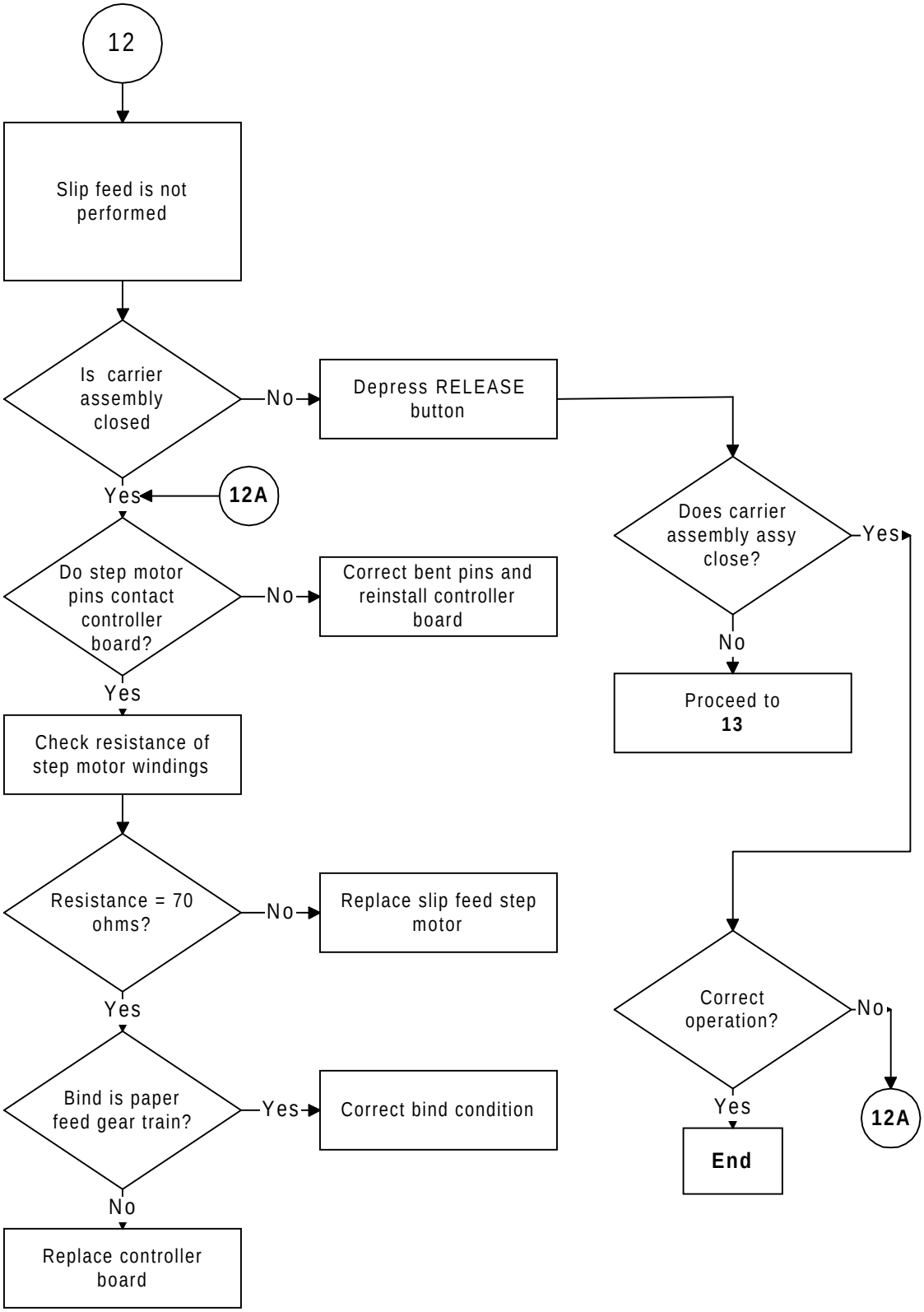

7
During data reception and printing, printing stops
Are any LEDs flashing
Yes
Refer to Table 1 LED INDICATORS
No
Is interface cable connected securely?
No
Reconnect interface cable
Yes
Replace printhead
Is Printer operation normal?
No
Replace controller board
Yes
End

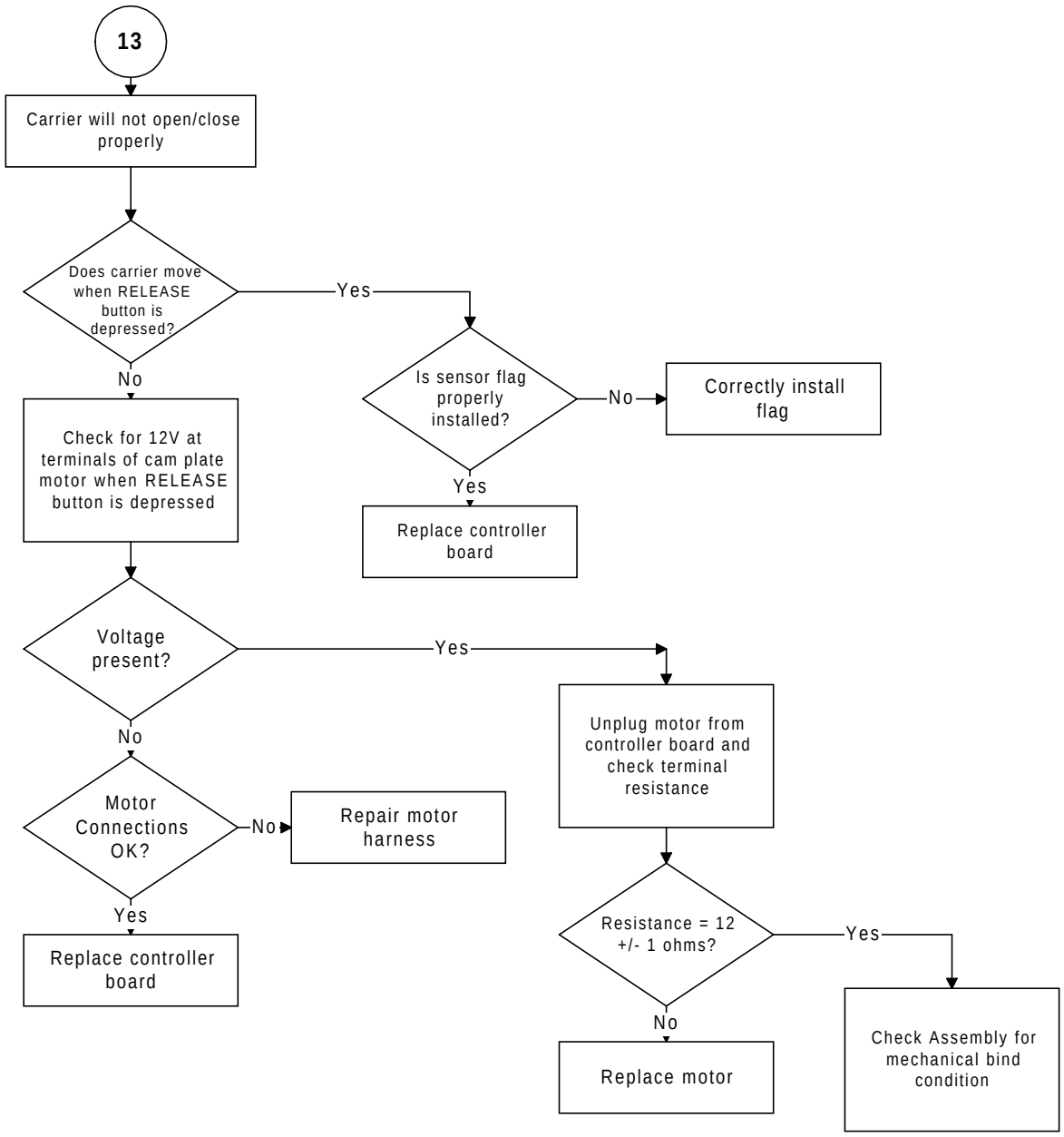

8
Wrong characters are printed or some characters are not printed
Is interface cable connected properly
No
Connect the cable properly
Yes
Does self test print normally?
No
Replace controller board
Yes
Is printer configured correctly?
No
Run configuration utility
Yes
Replace controller board

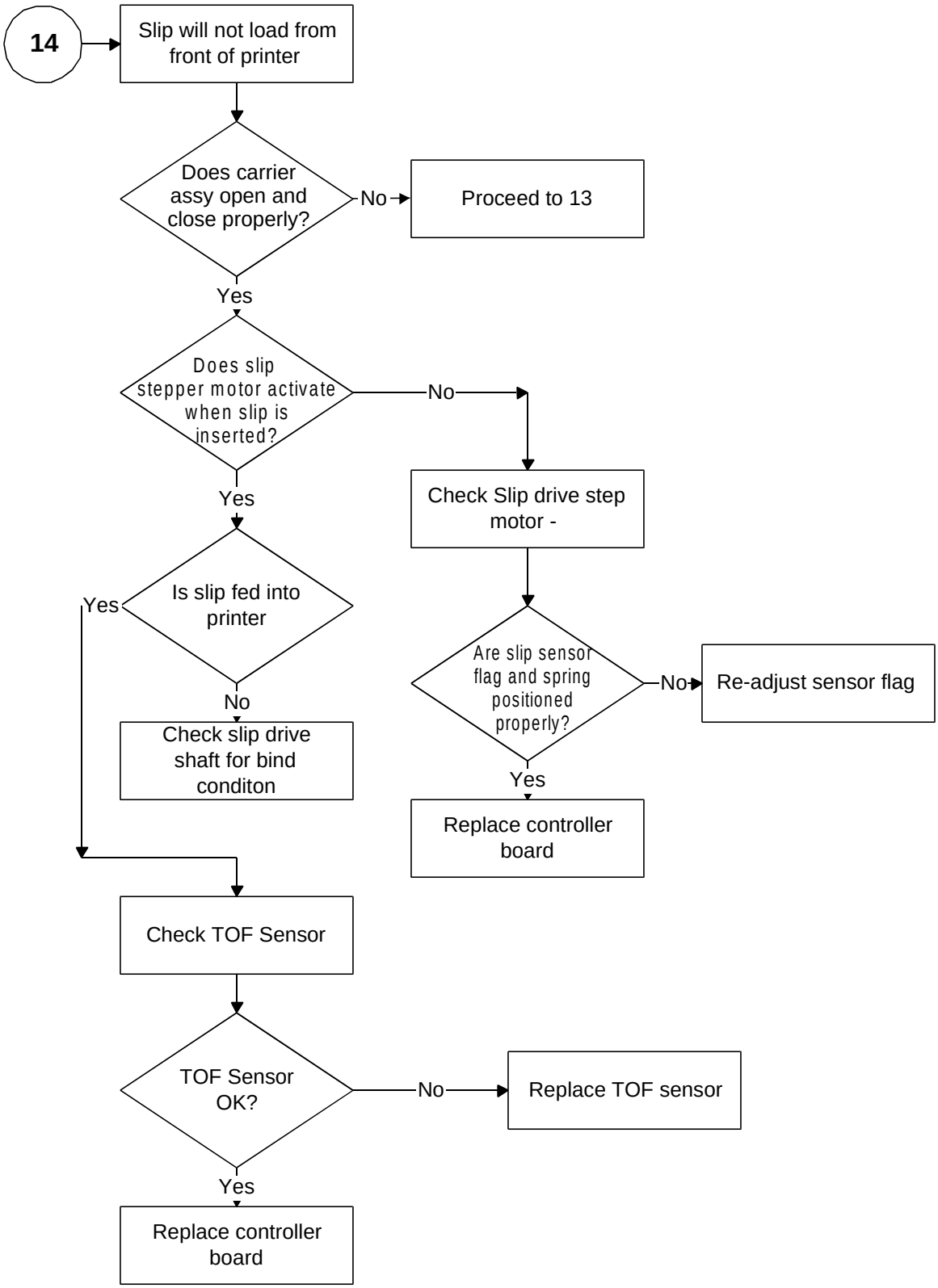

9
Some dots are not printed
Is the ribbon seated properly?
No
Seat the ribbon
Yes
Remove the printhead
Are any pins broken or mis-aligned?
Yes
No
Check resistance of printhead coil
Is resistance approx. 20 ohms?
No
Replace the printhead
Yes
Proceed to 6A

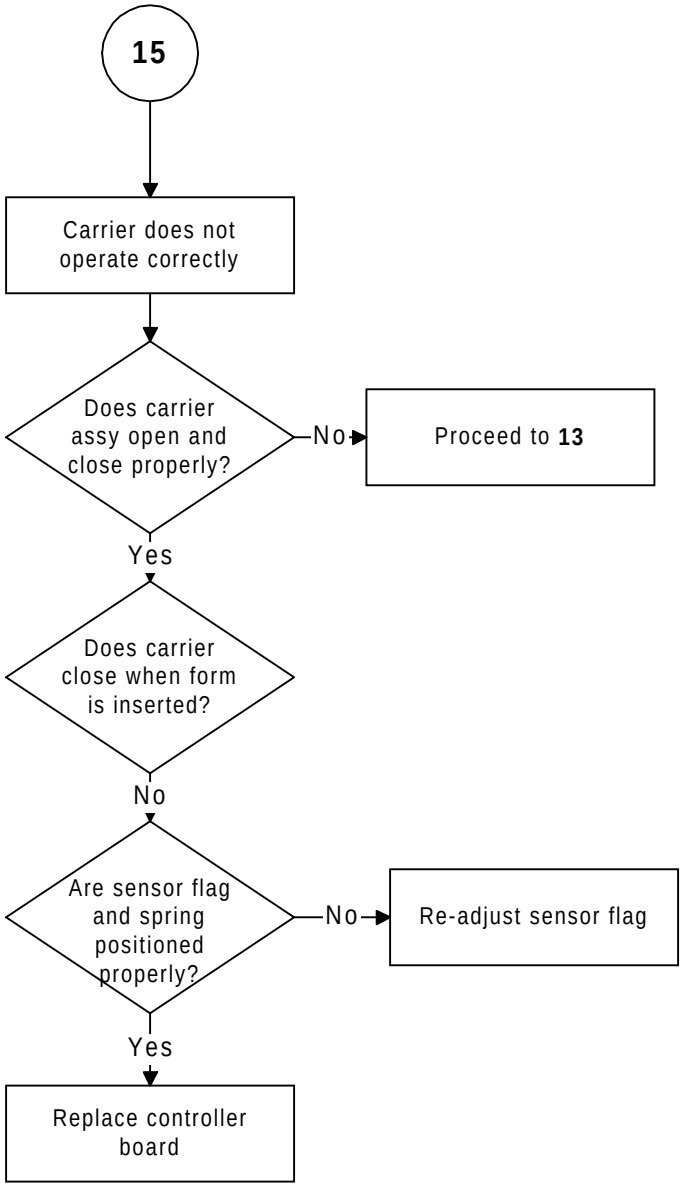

10
Print is not dark enough
Is the ribbbon feed operating properly?
No
Replace ribbon cassette
Is operation normal?
No
Replace ribbon feed gear assembly
Yes
END
Yes
Is ribbon wear excessive?
Yes
Replace ribbon cassette
No
Is head gap set correctly?
No
Adjust Head Gap
Yes
Are power supply voltages correct?
No
Replace power supply
Yes
Replace printhead
Is printer operation normal?
No
Replace controller board
Yes
END


11
Receipt feed is not performed
Is paper installed properly?
No
Install paper correctly
Yes
Is receipt feed step motor plugged in
No
Reconnect motor to controller board
Yes
Check resistance of step motor windings
Resistance 6.8 ohms?
No
Replace receipt feed step motor
Yes
Bind in paper feed gear train?
Yes
Correct bind condition
No
Is fuse F1 on controller board open?
No
Replace controller board
Yes
Replace Fuse


12
Slip feed is not performed
Is carrier assembly closed
No
Depress RELEASE button
Yes
12A
Does carrier assembly assy close?
Yes
No
Proceed to 13
Do step motor pins contact controller board?
No
Correct bent pins and reinstall controller board
Yes
Check resistance of step motor windings
Resistance = 70 ohms?
No
Replace slip feed step motor
Yes
Correct operation?
No
Yes
12A
Bind is paper feed gear train?
Yes
Correct bind condition
No
End
Replace controller board


13
Carrier will not open/close properly
Does carrier move when RELEASE button is depressed?
Yes
No
Is sensor flag properly installed?
No
Correctly install flag
Yes
Replace controller board
Check for 12V at terminals of cam plate motor when RELEASE button is depressed
Voltage present?
Yes
No
Unplug motor from controller board and check terminal resistance
Motor Connections OK?
No
Repair motor harness
Yes
Replace controller board
Resistance = 12 +/- 1 ohms?
Yes
No
Replace motor
Check Assembly for mechanical bind condition


14
Slip will not load from front of printer
Does carrier assy open and close properly?
No
Proceed to 13
Yes
Does slip stepper motor activate when slip is inserted?
No
Yes
Check Slip drive step motor -
Is slip fed into printer
Yes
No
Are slip sensor flag and spring positioned properly?
No
Re-adjust sensor flag
Yes
Check slip drive shaft for bind conditon
Replace controller board
Check TOF Sensor
TOF Sensor OK?
No
Replace TOF sensor
Yes
Replace controller board



LED INDICATORS

There are two indicators. One is Ready and the other is Status. The Ready indicator is tri-colored, red, green or orange.

The printer can be in any of the following states:

STATE	**READY** Indicator	**FORM** Indicator
1. Ready The printer is ready to receive data and print	Green	OFF
2. Printer Not Ready Cover is open	Flashing Green	OFF
3. Ready but waiting for a form	Orange	(Status)
Request Slip Form		Slow Flash
Request Validation Form		Fast Flash
Request Form be Removed		Med. Flash
4. Ready but low on receipt paper	Flash Orange/Green	OFF
5. Printer errors		
Out of Paper	Flashing Orange	OFF
Slip load failed		Slow Flash
Printer Fault (See Page 69)	Flashing Red	OFF
6. Menu Mode	Flash Orange/Green/Red	OFF
7. Test Mode	Flash Red/Orange	OFF
8. Printer Failure	Orange	OFF
9. Watch Dog Fault (Printer Resets)		

Table 2 LED Indicators

PRINTER FAULT INDICATORS

If the printer indicates Printer Fault, the error is not recoverable. The printer must be restarted and may lose information. To aid in printer trouble shooting, the “RESUME” key will activate an extended diagnostic indication. This will blink the status indicator a number of times. The number of blinks indicates the fault. These errors are as follows:

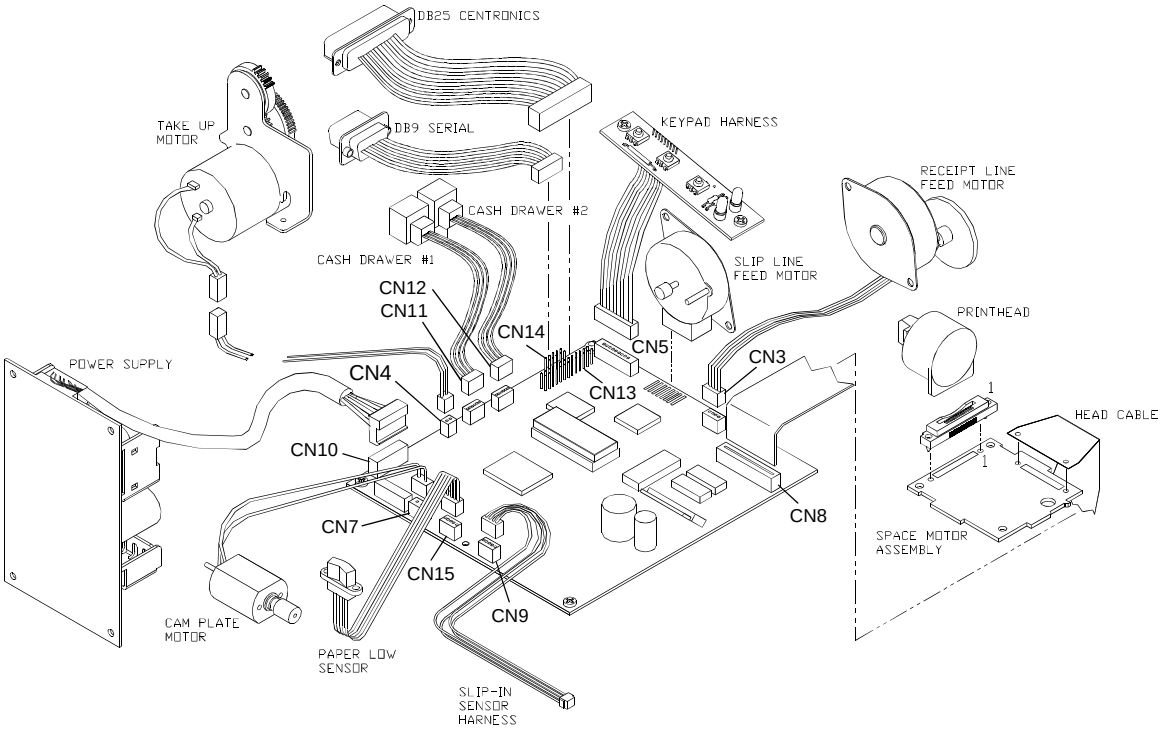
Faults while in operation:		
	1	Motor move time-out
	2	Motor move retry fault
	3	Motor move fault (Moved in wrong direction)
	4	Space motor locked

	5	Motor homing fault
	6	Motor acceleration fault
	7	Printing fault
	8	Fault while centering
	9	Forms compensation fault
Faults during level 0 diagnostics:		
	10	ROM check-sum failure
	11	RAM failure
	12	Configuration EEPROM failure
	13	Processor test fault
	14	EEPROM Check sum failure
Faults that can happen any time:		
	15	Firmware control fault. (Loss of program control)

Table 2 Fault Indicators

After the fault code is displayed, the printer can be restarted by pressing “RESUME” and “RELEASE” keys at the same time.
If the EEPROM Check sum fault occurs (Fault Code 14), the EEROM can be set to defaults by pressing “RESUME” and “LF” keys at the same time. The printer will now be functional but must be reconfigured. This procedure is only to allow reconfiguration and not to recover printer function in the field.
If the indication is “Printer Failure”, the printer controller is not running and is being held in reset. If this failure occurs the printer is not functional and should be serviced.

If the printer appears to go through a power cycle by itself, the hardware watch dog has detected a fault. This fault is generally a hardware failure or an external interference. If the fault is hardware the printer will continue to cycle through it’s diagnostics and then reset. If this happens the printer must be serviced. If the fault is caused by external interference like electrostatic discharge, the printer will generally recover by itself. (NOTE: The parallel port INIT pin causes a soft reset.)



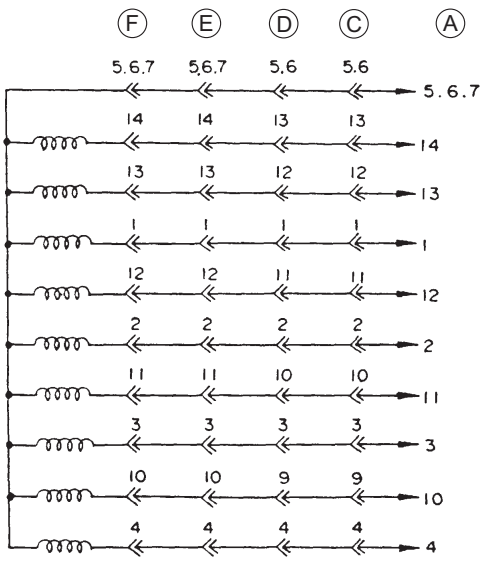
Note: This illustration is referenced by the letters in the troubleshooting flowcharts and in the illustrations on the following three pages.

CHECKING CONNECTIONS AND RESISTANCE

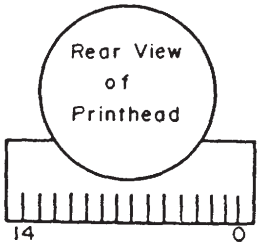
PRINTHEAD

The following illustration shows the connection circuit for the Printhead and the rear of the Printhead. The resistance should be approximately 20 ohms.

Pins at Connection	Signals	Pins on Printhead	Rear of Printhead



Common	5, 6, 7
Wire #1	14
Wire #2	13
Wire #3	1
Wire #4	12
Wire #5	2
Wire #6	11
Wire #7	1
Wire #8	10
Wire #9	4

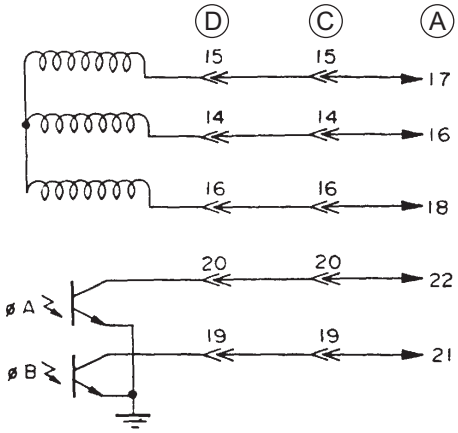


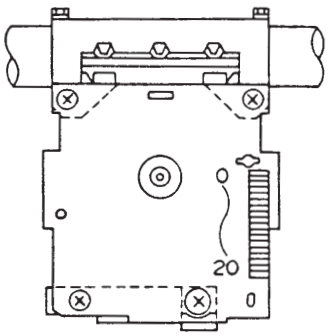
The following example shows how to measure the resistance.
Use 5, 6, 7 on printhead and measure with a meter to pin 14 at location A. The resistance should read 20 ohms. This procedure checks the circuit of wire number one of the printhead. Refer to Figure 45 on page 71.

SPACE MOTOR ASSEMBLY

The following illustration shows the connection circuit for the Space Motor Assembly and the pins on the Space Motor. The resistance should be approximately 21 ohms between pads 17 and 16, 16 and 18, and 17 and 18 on the Space Motor.

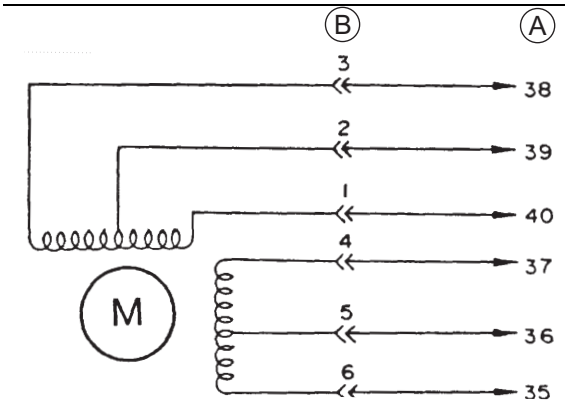
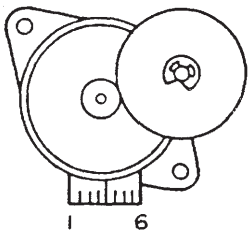
Pins at Connection	Signals	Pins on Space Motor
	V	15
	U	14
	W	16
	A	
	B	





LINEFEED MOTOR (SLIP)

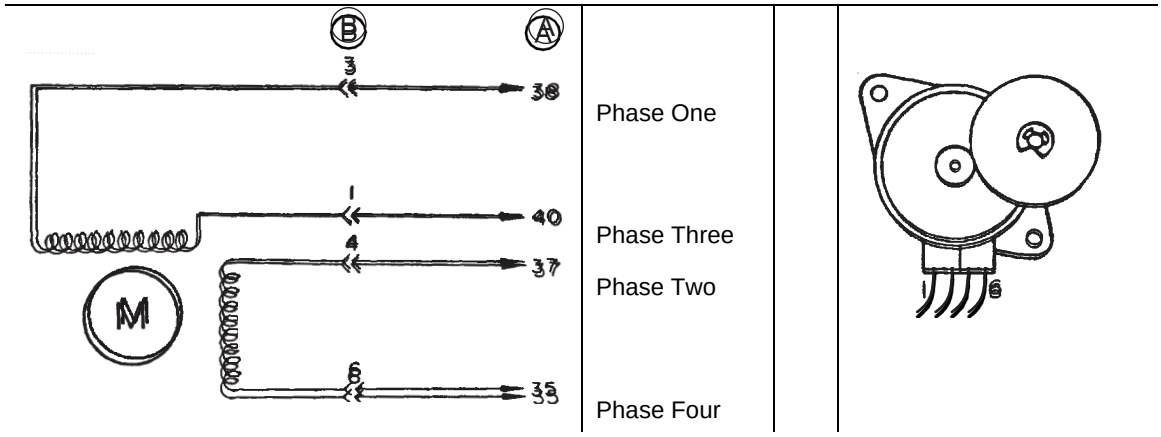
The following illustration shows the connection circuit for the Linefeed Motor. The resistance of each coil should be approximately 70 ohms between pads 38 and 39, 39 and 40, 37 and 36, and 36 and 35 on the Linefeed Motor.

Pins at Connection	Signals	Pins on Linefeed Motor	
	Phase One Common Phase Three Phase Two Common Phase Four	3 2 1 4 5 6	

LINEFEED MOTOR (RECEIPT)

The following illustration shows the connection circuit for the Linefeed Motor. The resistance of each coil should be approximately 6.8.

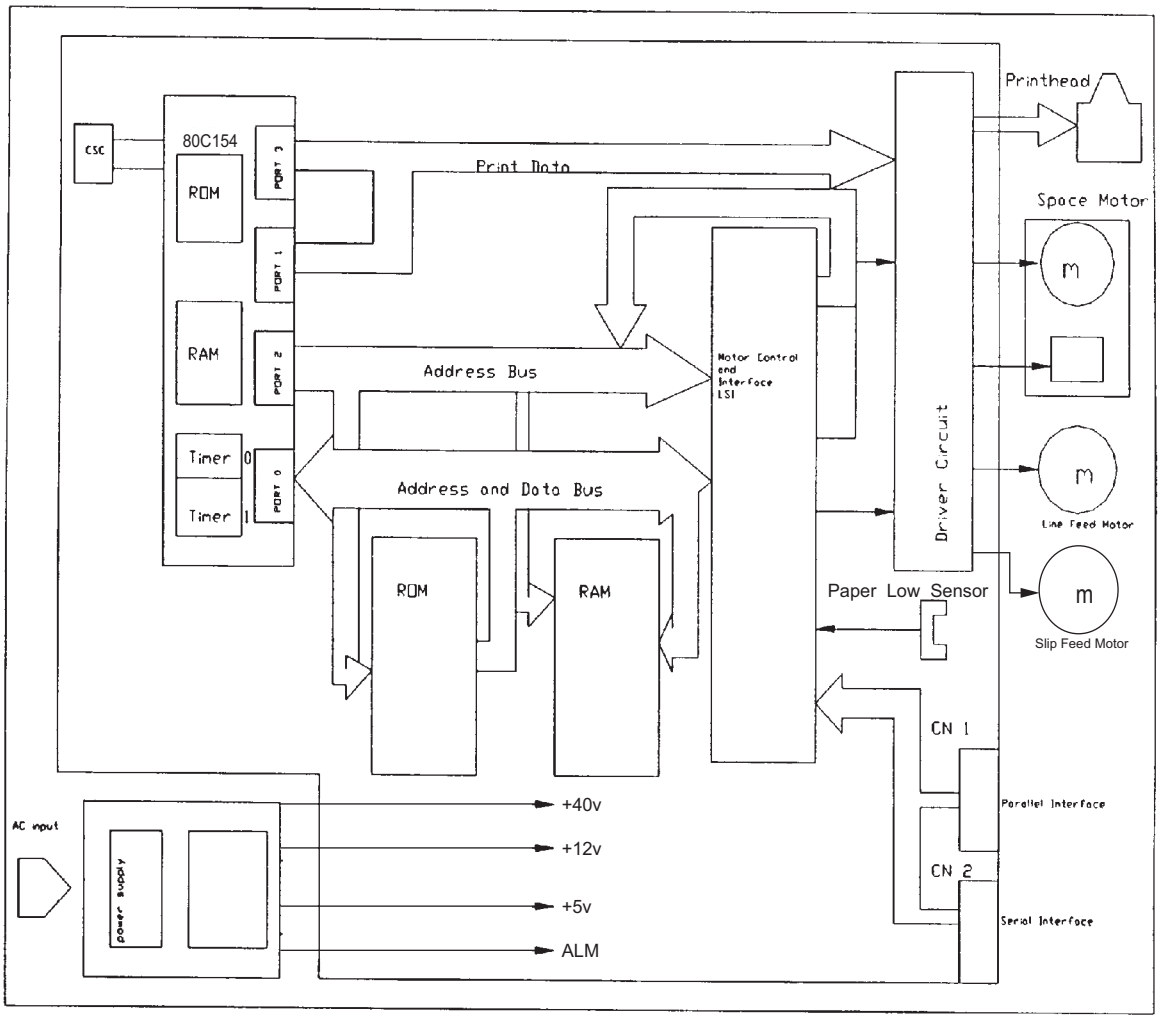
Pins at Connection	Signals	Pins on Linefeed Motor



APPENDIX A: THEORY OF OPERATION

ELECTRICAL OPERATION

CIRCUIT OPERATION



The electrical section of the printer consists of the components shown in above diagram.
The Control Board contains the Microprocessor and its peripheral circuits, and all associated drive circuits for the Printhead, Line Feed Motor, Slip Feed Motor, Journal Take-up Motor, Cash Drawers and Sensors. The printer control signals from the host system (PC or terminal) are brought directly to the Control Board from the rear panel on the printer.

MICROPROCESSOR AND PERIPHERAL CIRCUITS

MICROPROCESSOR (U1: 80C154)

The Microprocessor is the nucleus of the Control Board. It controls the peripheral circuits.

PROGRAM ROM (U4)

The program ROM stores the control program for the printer.

PROGRAM RAM (U2)

The RAM stores printer configuration information.

RAM (U5)

The RAM stores data such as received print data.

LSI (M7U042-026)

The M7U042-026 motor control LSI has the following functions:

- Space Motor Speed Control Function
- Dot Timing Generation Function
- I/O Ports
- Address Latch
- Address Decoder

Space Motor Speed Control Function

This function accelerates and decelerates the Space Motor in accordance with commands from the Microprocessor and controls the Space Motor speed in each printing mode.

Dot Timing Generation Function

This function generates the dot timing signal (/IPT), synchronized with the printing speed in accordance with output signals (PHASE A, B) of the encoder on the Space Motor, and sends this timing information to the Microprocessor.

I/O Ports

The input and output ports control signals in accordance with the commands input from the Microprocessor.

Address Latch

The address latch latches the low-order 8 bits of the address (A0 to A7). These bits are used as an address for read/write operations with peripheral devices.

Address Decoder

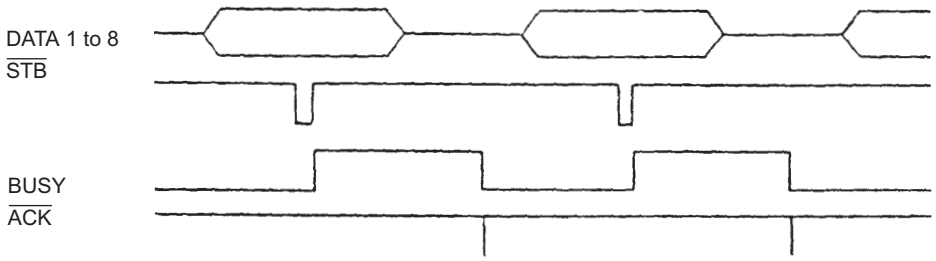
The address decoder decodes the address signal (A11 to A15) and sends the /RAMSEL4 signal.

INITIALIZATION

The printer is initialized when the power is turned on or when the parallel interface signal, I-PRIME, is received from the host computer.
Initialization is started with the RSTOUT signal output from the reset circuit to reset U1 (micro-processor), and U3 (LSI).
When resetting is completed, the program starts with mode setting of U1, U3, and U5, memory (ROM and RAM) check, AM initialization, and then carriage homing. The program finally establishes the interface signals (output of ACK signal, BUSY signal, etc.), lights the select indicator, and informs the host system that the printer is ready for data reception (in the data reception wait state). This completes the initialization routine.

INTERFACE CONTROL

PARALLEL INTERFACE

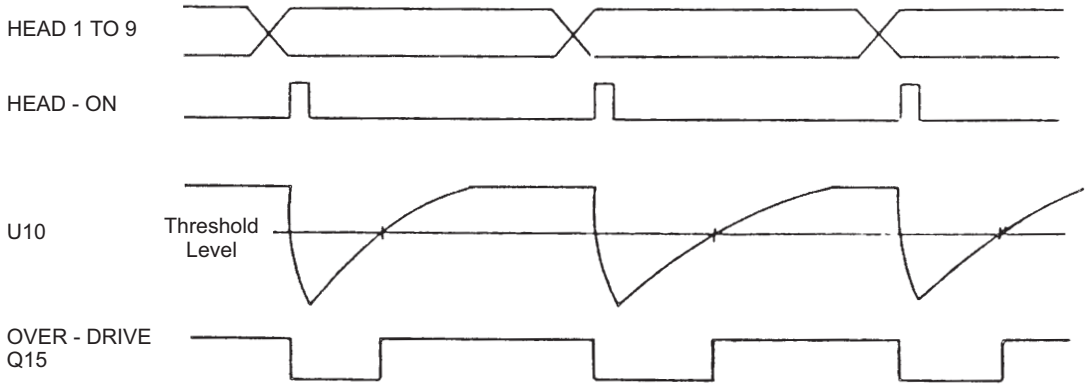


The data from the interface is input through the connector (CN13), and the interface LSI (U3: 7U042-026) latches this input data in sync with the /STB signal.
The BUSY signal is on during processing of this data. When the processing is completed, the BUSY signal is turned off, and an /ACK signal is sent to request more data.

SERIAL INTERFACE

This data from the interface is input through the connector (CN14), and the serial drive (U18: DS1229S), with data I/O to the microprocessor.

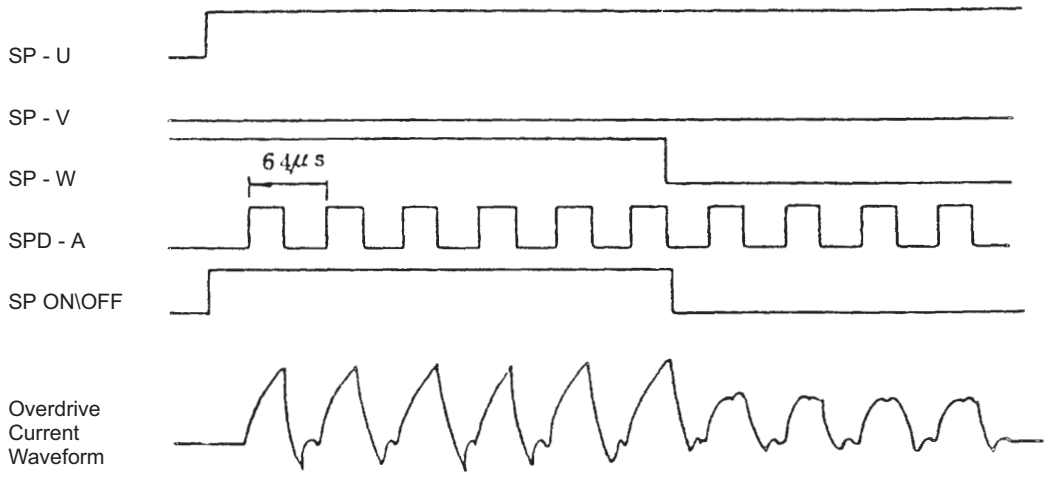
PRINTHEAD DRIVE CIRCUIT



This circuit drives the head magnets corresponding to the HEAD DATA 1 to 9 signals in accordance with the HEAD-ON signal. This makes the print head print characters.
When the HEAD-ON signal goes high, the RC integrator (R76, and C24) determines the head drive time. The integrator lengthens the drive time if the drive voltage (+40) lowers, and shortens the drive time if the voltage rises. This maintains consistent print wire impact force.

CARRIAGE DRIVE

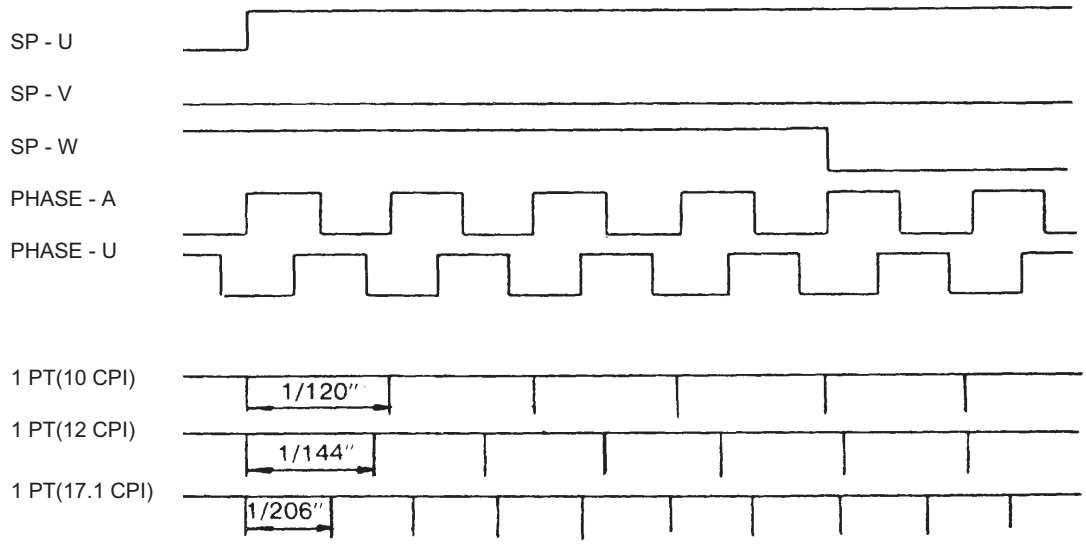
SPACE MOTOR CONTROL



The motor control LSI(U3: M74042-026) outputs the space motor phase signals (SP-U, SP-V, SP-W) in accordance with the spacing command from the microprocessor, and at the same time outputs the overdrive signal (SPD-A).

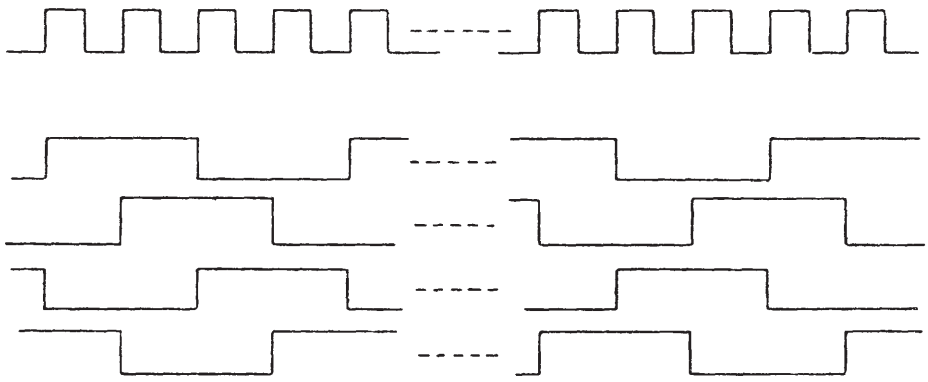
The SPD-A signal is a fixed-period pulse signal whose pulse width is controllable by the program, and is used to control the motor drive time.
The SP ON/OFF signal is output during acceleration and deceleration when greater torque is required.
The motor driver (MTDV) drive the space motor in accordance with these signals. Pins 9 and 11 of the MTDV are for the over-voltage (9) and over-current (11) protective circuits.

SLIT ENCODER



Space motor PHASE-A and PHASE-B signals are generated by a photo-sensor and a slit disk. The control LSI (U3: M7U042-026) frequency divides these edge pulse signals at a rate dependent upon the print pitch, and outputs the /IPT signal to provide dot-on and carriage position timing.

LINEFEED



The Linefeed Motor is locked with the +5 voltage while it is stopped. When line feeding, the Linefeed motor is driven by the +40 supply in accordance with the LF OVD signal.

ALARM CIRCUITS

DRIVE CIRCUIT FAULT ALARM CIRCUIT

This is a protective circuit that makes the Power Supply Shut down when a fault occurs in the Printhead Drive Circuit, Space Motor Drive Circuit, Line feed Motor Drive Circuit, or their peripheral circuits.
The circuit operates by monitoring the drive time using the HDALM, SPALM, and LFALM signals interlocked with the overdrive signal of each drive circuit. If the drive time of any circuit exceeds the specified time, the drive circuit fault alarm outputs an ALM signal to the Power Supply.
In the event that their is a component failure in the Drive Circuits, two fuses are located on the Controller Board to prevent further damage.
Fuse (F1) will blow if their is a component failure in the Line Feed Motor Drive Circuit.
Fuse (F2) will blow if their is a component failure in the Space Motor Drive Circuit.

HEAD OVERHEAT ALARM CIRCUIT

In order to protect the head coils, this circuit monitors the head temperature using the built-in thermistor of the printhead.
If heavy-duty printing is performed continuously for a long time, the printhead temperature rises. When the Printhead temperature reaches approximately 100° C, a head overheat alarm occurs. At this point, the print mode is switched from bi-directional to uni-directional to reduce the duty-cycle which in turn lowers the temperature of the Printhead. When the Printhead temperature returns below the alarm detection temperature, bi-directional printing is resumed.
When the temperature of the Printhead rises during operation, the resistance of the thermistor lowers, and the potential of the comparator (U10) negative input lowers to invert the comparator's output, causing the HEAD TEMP signal to be output to the control LSI.
The printer will slow down printing until the temperature falls back below the threshold.

Note: This is a normal operation and will not cause any data loss. Do not turn the printer off or data loss will result.

POWER SUPPLY

The power supply is a self contained integrated switching Power Supply. The internal fuse (F1) located on the power supply will blow if the supply has an internal fault.
The power supply has the following outputs +5 VDC, +12 VDC, +40 VDC, and a alarm signal.

AC INPUT

The AC input and Power Switch are located at the back of the printer.

MECHANICAL OPERATION

PRINTHEAD MECHANISM AND OPERATION

The Printhead is spring-loaded, using a permanent magnet, and can be easily removed or installed. The Printhead is mounted on a Carriage that runs parallel to the Platen and is connected with the control circuit via the Circuit Board.
The Printhead consists of the following items:

- Wire Guide
- Wires
- Armature Assembly
- Yoke
- Springs

- Spacer
- Magnet Assembly
- Thermistor
- PC Board

PRINTHEAD OPERATION

When the Printhead is in the non-printing state, each armature is attracted by the permanent magnet and the springs holding the armatures are compressed by the thickness of the spacer. Therefore, the print wires, which are fastened to the individual armatures, are held retracted within the wire guide.
When signals corresponding to a character to be printed are detected by the control circuit, currents flow through the corresponding coils to nullify the magnetic flux generated by the permanent magnet assembly. With the magnetic flux nullified, the print wire coil armatures are driven toward the Platen by the force of the armature springs. The print wires, fastened to the armatures, are ejected from the tip of the wire guide and strike the paper through the ribbon.
After the character is printed, the magnetic flux of the permanent magnet assembly attracts the armatures again which retract the print wires back into the wire guide.
The Printhead has a built-in thermistor to prevent the coils from overheating.

SPACE MECHANISM AND OPERATION

The spacing operation is performed by the DC Motor driving the Carriage Frame, which is guided by the Carriage Shaft mounted parallel to the Platen. The DC Motor is mounted on the bottom of the Carriage Frame.
The Space Mechanism consists of the following items:

- DC Motor with Motor Gear
- Carriage Frame
- Carriage Shaft
- Space Rack
- Slit Sensor
- Slit Disk

The Carriage, with the Printhead and Space Motor mounted on it, moves parallel to the Platen along the Carriage Shaft. As the Space Motor rotates counterclockwise, the motor gear is driven to the right along the Space Rack, and as a result, the Carriage is also driven to the right.
The spacing mechanism is designed such that when the Space Motor rotates one turn, the Carriage Frame moves 0.8 inches (20.32 mm).
Motor rotation also rotates the Slit Disk, and the slits pass through the Slit Sensor. The position of the Carriage Frame can be obtained by counting the number of slits detected by the slit sensor.

RIBBON FEED MECHANISM AND OPERATION

The Ribbon Feed Mechanism feeds the Ribbon synchronously with the spacing operation. The mechanism is driven by the Space Motor.

The Ribbon Feed Mechanism consists of the following items:

- Ribbon Feed Gear Assembly
- Ribbon Gear (Space Motor)
- Ribbon Cartridge

RIBBON FEED OPERATION

As the Space Motor rotates, the Ribbon Gear on the Space Motor Shaft rotates to drive the Drive Gear in the Ribbon Cartridge via the Ribbon Feed Gear Assembly. As a result, the Ribbon is fed.
In bi-directional printing, the Ribbon Gear rotational direction reverses every time the Carriage reverses direction. In this case, the gears in the Ribbon Feed Gear Assembly switch the rotational direction to feed the Ribbon in a fixed direction.

RIBBON CARTRIDGE

A one-way-feed endless ribbon is used. Ink is replenished by the built-in ink tank in the ribbon cartridge. This assures clear printing.

PAPER FEED MECHANISM AND OPERATION

The printer has two motors which feed paper. The receipt drive feed motor and a slip drive feed motor, depending on what operation the printer is performing one or both motors will be feeding paper.

RECEIPT FEED MOTOR

The printer feeds paper by rotating the Platen Assembly, which is driven by the Receipt Feed Motor through a speed reduction gear. The paper is pinched between the Receipt Pressure Roller and Platen.
The Receipt Paper Feed Mechanism consists of the following items:

- Stepper Motor with Gear
- Receipt Pressure Roller
- Platen Assembly

The Receipt Paper Feed Stepper Motor is mounted on the right side of carrier assembly, and its rotation is transmitted thru the receipt feed motor drive train.

SLIP FEED MOTOR

The printer feeds paper by rotating the Feed Rollers, which is driven by the Slip Feed Motor through a speed reduction gear. The paper is pinched between the Feed Roller and Spring Plate. This maintains constant pressure regardless of the thickness of the paper or form.
The Slip Paper Feed Mechanism consists of the following items:

- Stepper Motor with Gear
- Feed Roller
- Spring Plate

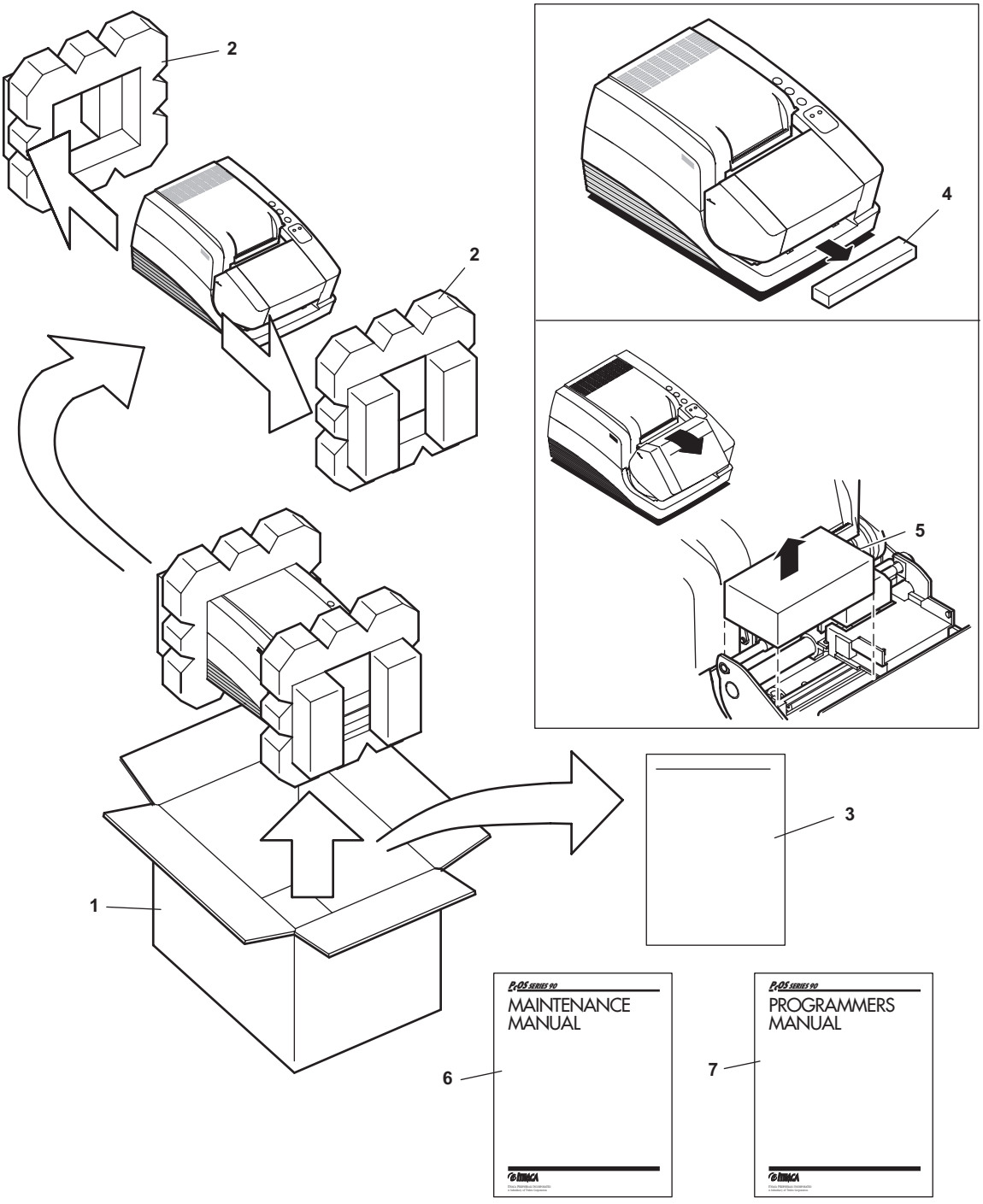
The Slip Paper Feed Stepper Motor is mounted on the right side of mechanism base plate, and its rotation is transmitted thru the slip feed motor drive train.

PAPER-LOW DETECTION MECHANISM AND OPERATION

Paper is sensed in the printer by an optical sensor. When the sensor no longer senses that the paper is next to the sensor a paper low condition exist. The printer continues to count line feeds to determine the actual end of the paper roll.

APPENDIX B: PARTS LISTS

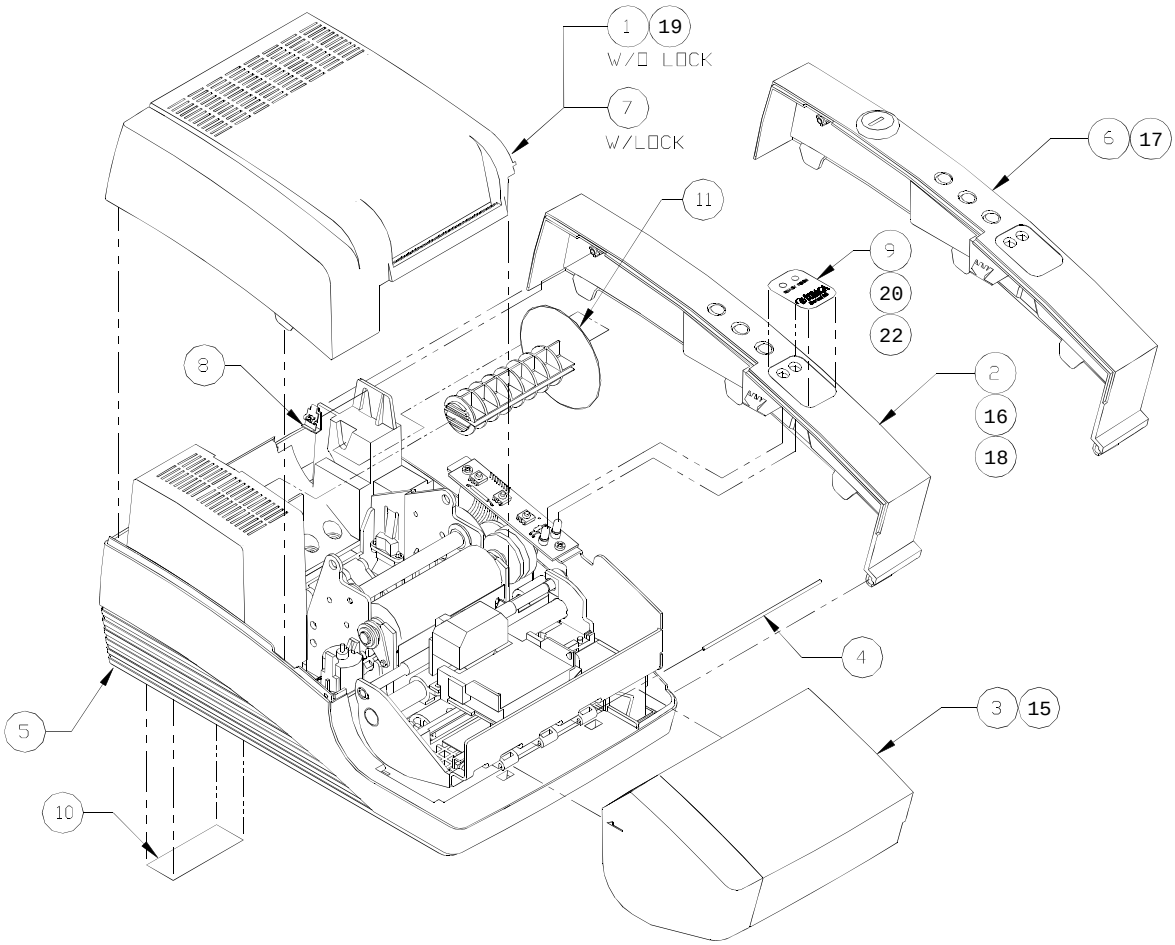
PACKING MATERIALS/PUBLICATIONS



ITEM NO.	PART NO.	QTY	DESCRIPTION

1	90-7578	1	Box
2	90-7577	1	Foam Set
3	90-7459	1	Publications Kit, (includes the Operator's Guide)
4	90-7570	1	Cantilever Restraint
5	90-7568	1	Print Head Restraint
6	90-7899	1	Maintenance Manual
7	100-7586	1	Programmers Manual

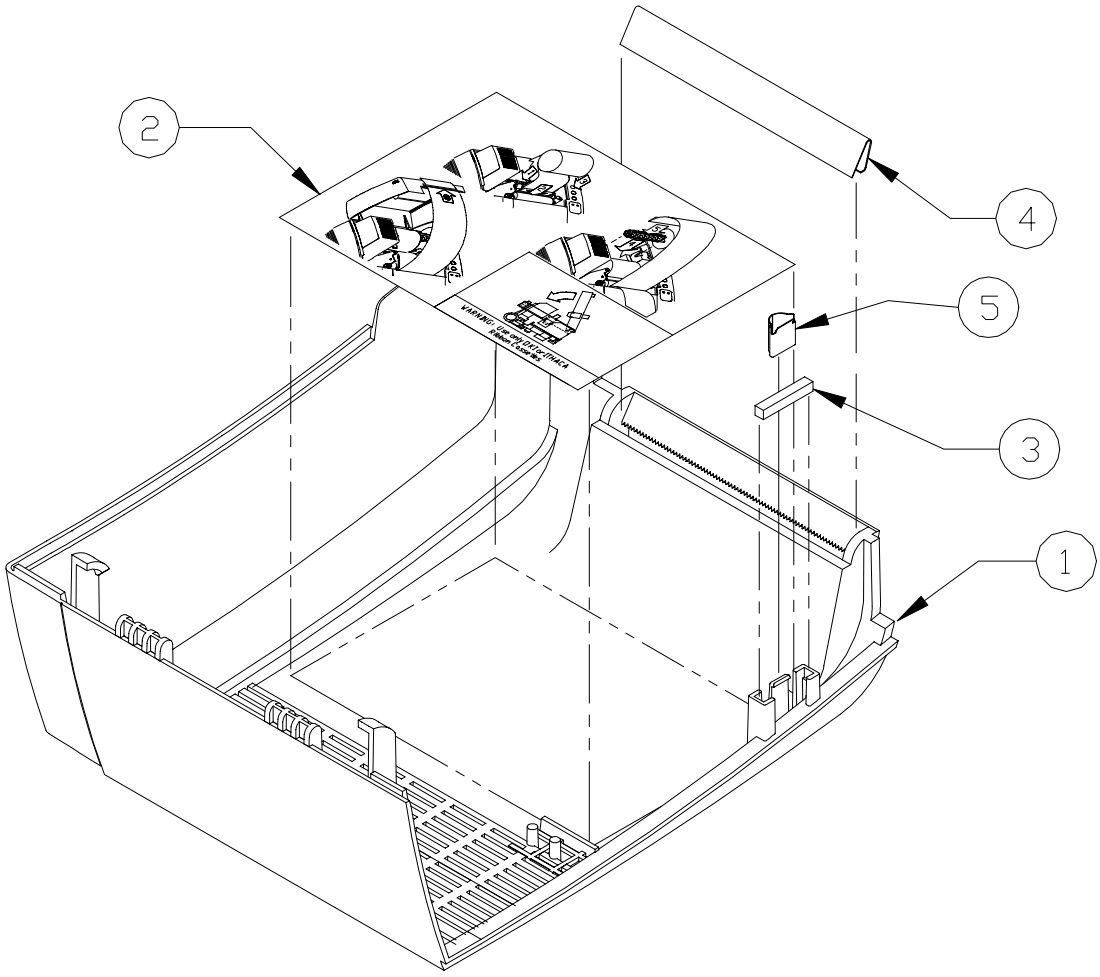
PRINTER ASSEMBLY



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-7449	1	Cover - Paper without Lock (Light Tan)
2	90-7464	1	Assembly - Right Cover without Lock (Light Tan)
3	90-6422	1	Cover - Cassette (Light Tan)
4	90-6425	1	Pin - Hinge
5	90-7551	1	Assembly - Mech/Elec Base
6	90-7470	1	Cover - Right with Lock (Light Tan)
7	90-7443	1	Cover - Paper with Lock (Light Tan)

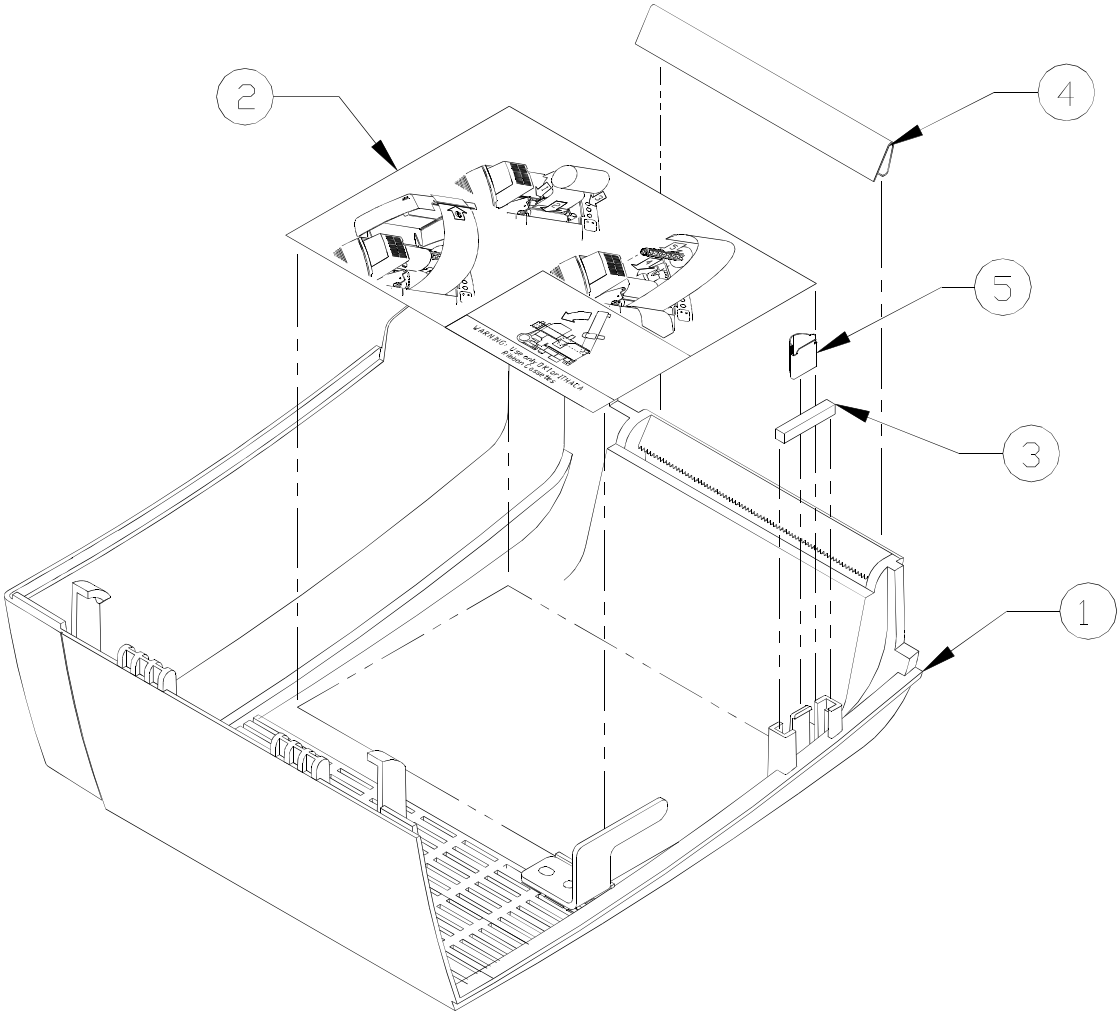
8	98-6326	1	Clip - Right Cover
9	90-6639	1	Label - Keypad (Ithaca)
10	98-7152	1	Plate - Serial IP
11	90-6415	1	Spindle - Take-Up
12	90-7867	1	Label - “No Logo” Keypad (Light Tan)
13	90-7892	1	Label - “OKI” Keypad
14	90-7893	1	Cover - OKI Cassette
15	90-7912	1	Cover - Cassette (Gary)
16	90-7879	1	Assembly - Right Cover (OKI Keypad)
17	90-7880	1	Assembly - Right Cover with Lock (OKI Keypad)
18	90-7934	1	Assembly - Right Cover (Gary)
19	90-7922	1	Cover - Paper (Gary)
20	90-9040	1	Label - Keypad (Gary)
21	90-7977	1	Label - “Hewlett Packard” Keypad

PAPER COVER ASSEMBLY (90-7449)



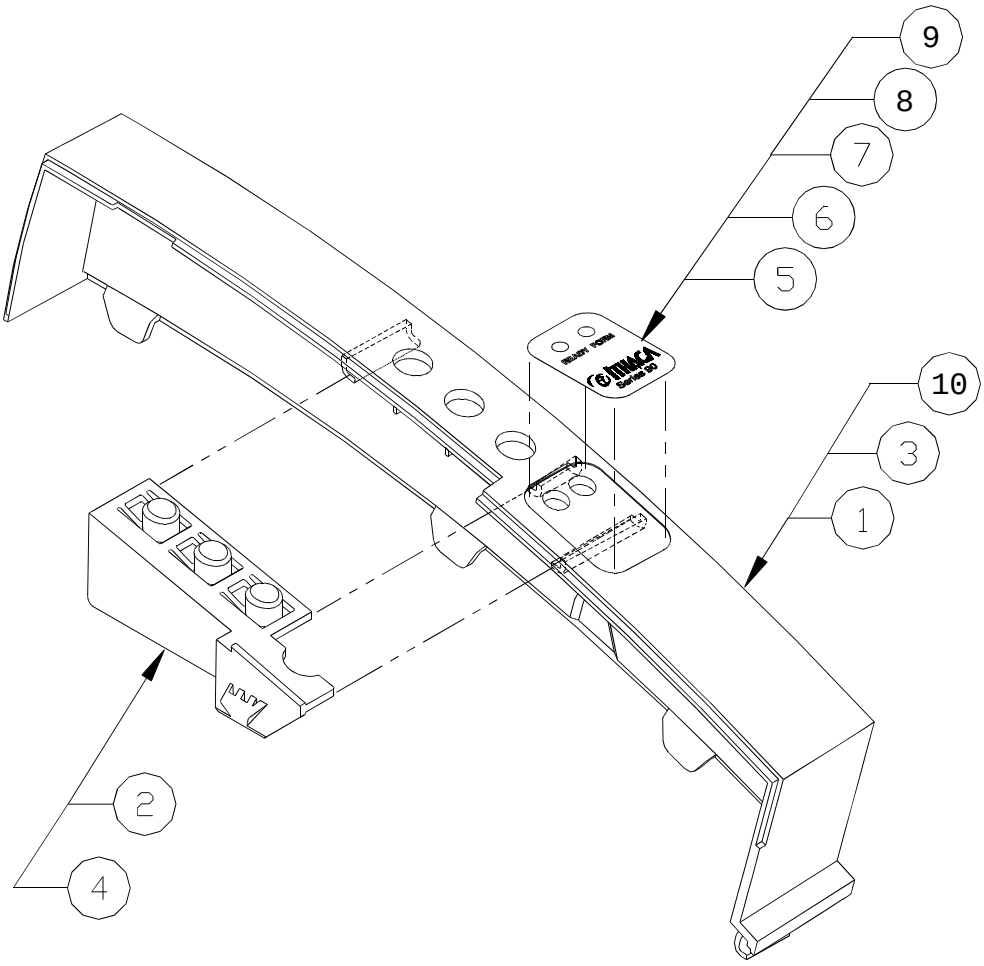
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6325	1	Cover - Paper
2	90-7455	1	Label - Paper Loading
3	98-6498	1	Magnet - Bar
4	90-6040	1	Tear-Off
5	98-7897	1	Retainer - M90 Magnet

PAPER COVER ASSEMBLY WITH LOCK (90-7443)



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-9041	1	Paper Cover with Lock
2	90-7455	1	Label - Paper Loading
3	90-6498	1	Magnet - Bar
4	90-6040	1	Tear - Off
5	98-7897	1	Retainer - M90 Magnet

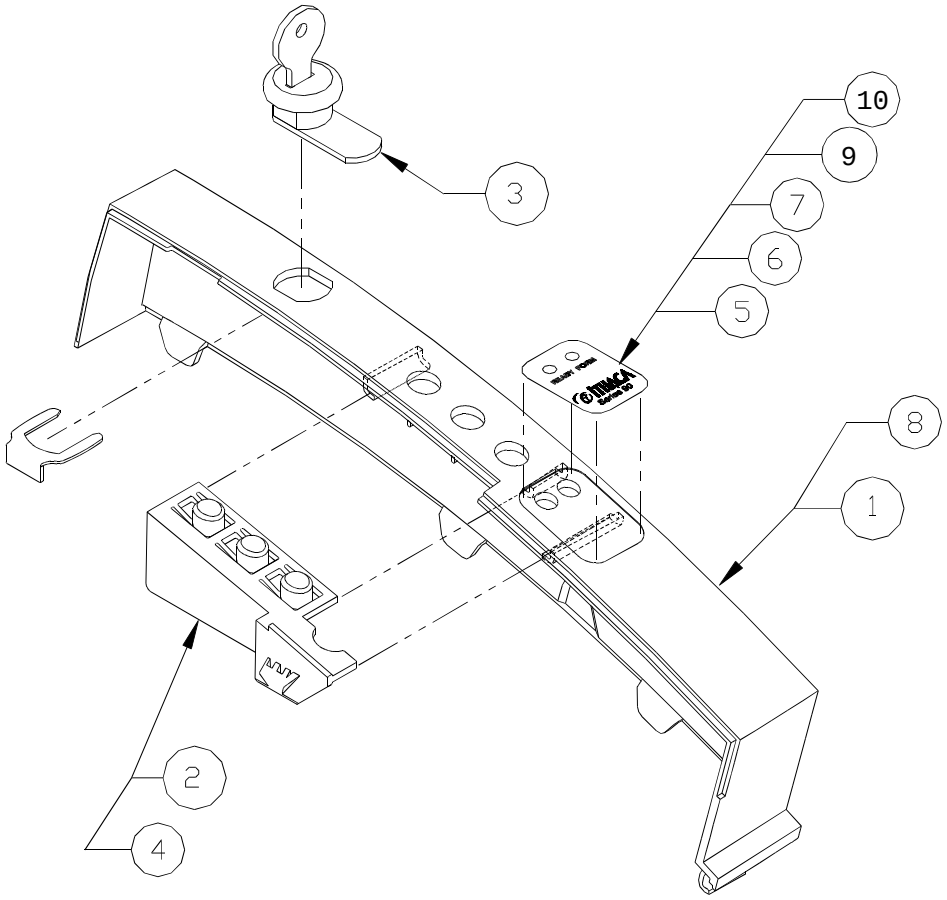
RIGHT COVER ASSEMBLY (90-7464)



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6322	1	Cover - Right (Ithaca)
2	90-6418	1	Button - PCB (Green)
3	90-6323	1	Cover - Right (OKI)
4	90-6419	1	Button - PC board (OKI Gray)
5	90-6639	1	Label - Keypad (Ithaca) *
6	90-7867	1	Label - Keypad (No Logo) *
7	90-7892	1	Label - Keypad (OKI) *
8	90-9040	1	Label - Keypad (Gary (No Logo)*
9	90-7977	1	Label - Keypad (Hewlett Packard)*
10	90-7929	1	Cover - Right (Gray)

* order separately from assembly 90-7464

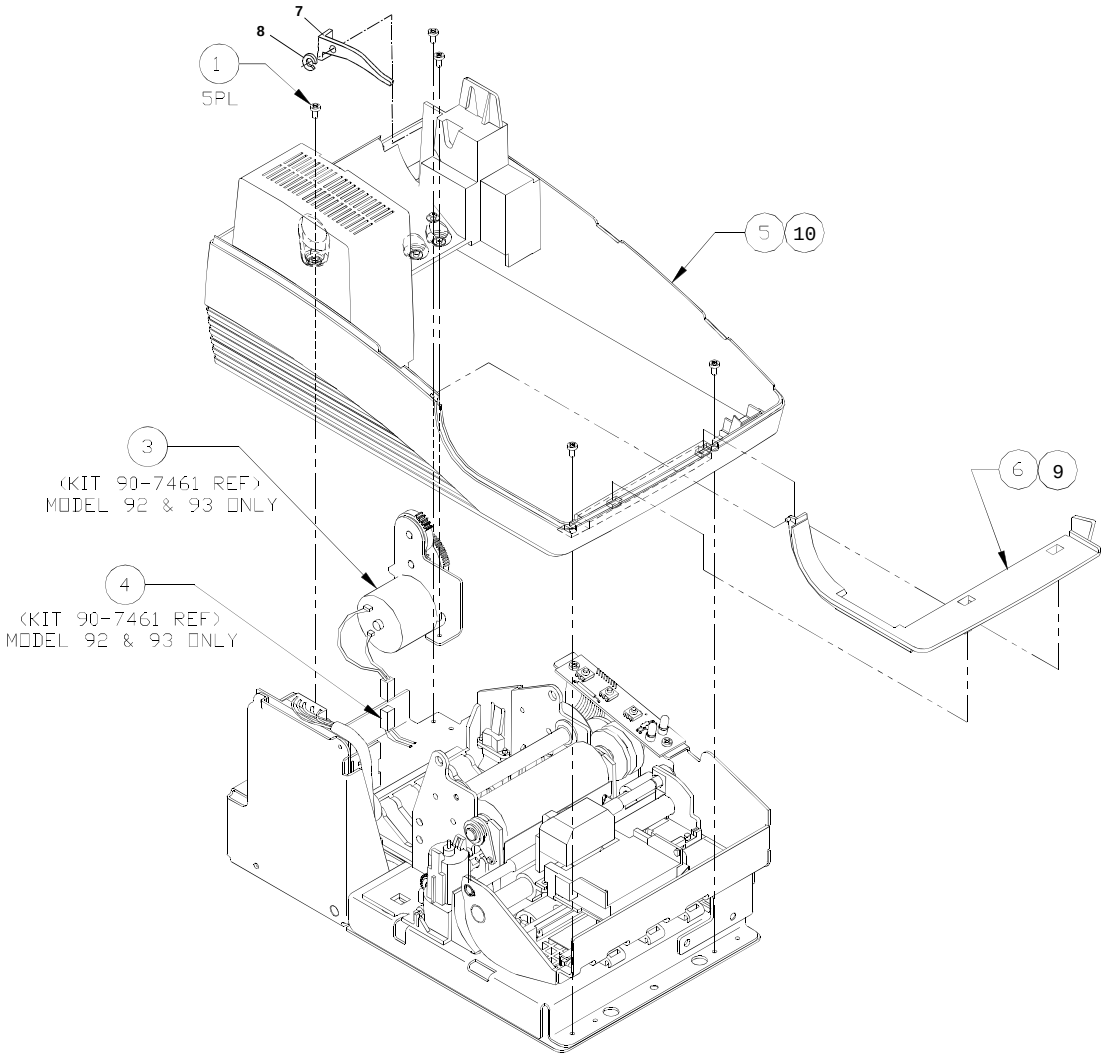
RIGHT COVER ASSEMBLY WITH LOCK (90-7470)



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6322	1	Cover - Right (Ithaca)
2	90-6418	1	Button - PCB (Green)
3	90-6429	1	Assembly - Journal Lock
4	90-6419	1	Button - PC Board (OKI Gray)
5	90-6639	1	Label - Keypad (Ithaca) *
6	90-7867	1	Label - Keypad (No Logo) *
7	90-7892	1	Label - Keypad (OKI) *
8	90-6323	1	Cover - Right (OKI Gray)
9	90-9040	1	Label - Keypad (Gray) (No Logo)*
10	90-7977	1	Label - Keypad (Hewlett Packard)*

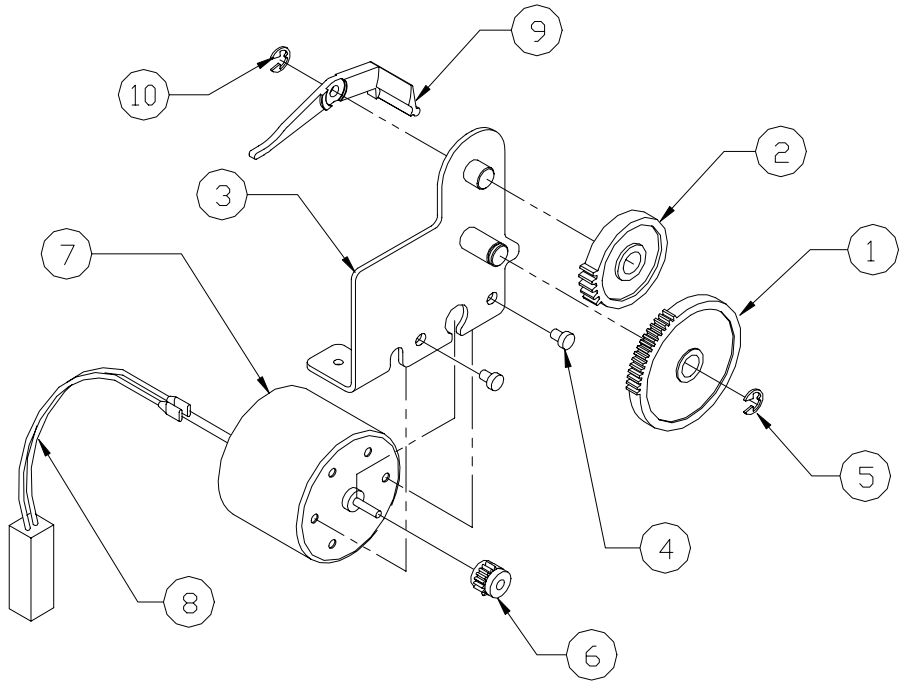
* order separately from assembly 90-7464

BASE CABINET AND TAKE-UP MOTOR



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	98-0611	5	Screw - M3x6mm PHPS PHD
3	90-7462	1	Assembly - Take-up Motor
4	90-6641	1	Harness - Journal Take-up Intermediate
5	90-6320	1	Base - Cabinet (Light Tan)
6	90-6321	1	Bezel Cabinet (Light Tan)
7	90-6460	1	Arm
8	520-9800002	1	Keeper - E-Ring (5133-12)
9	90-7906	1	Bezel - Cabinet (Gary)
10	90-7901	1	Base - Cabinet (Gray)

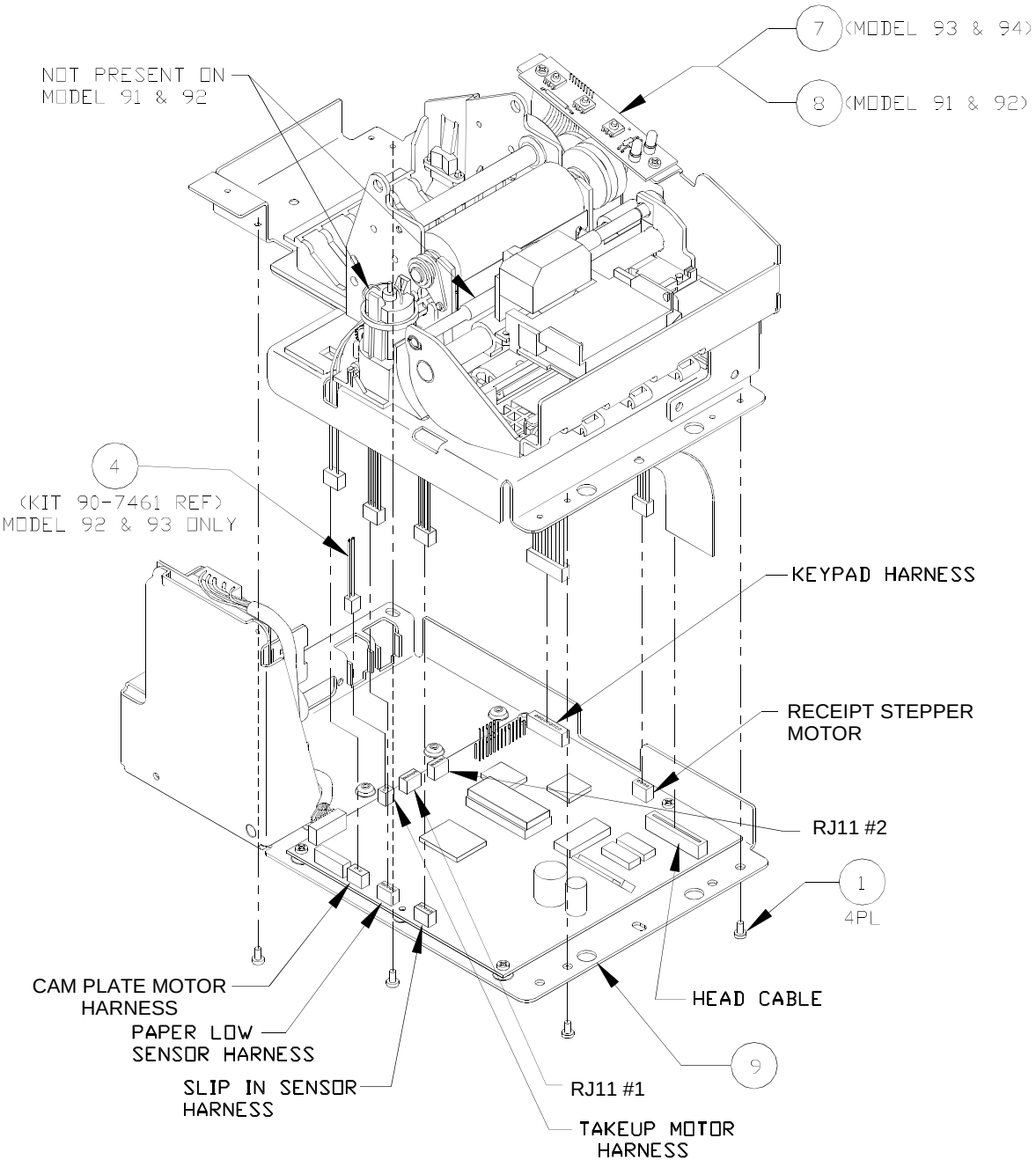
TAKE-UP MOTOR ASSEMBLY



Note: 1. White Wire of 90-6624 to be connected to Negative (-) Terminal of 06-1187.
2. Black Wire of 90-6624 to be connected to Positive (+) Terminal of 06-1187.

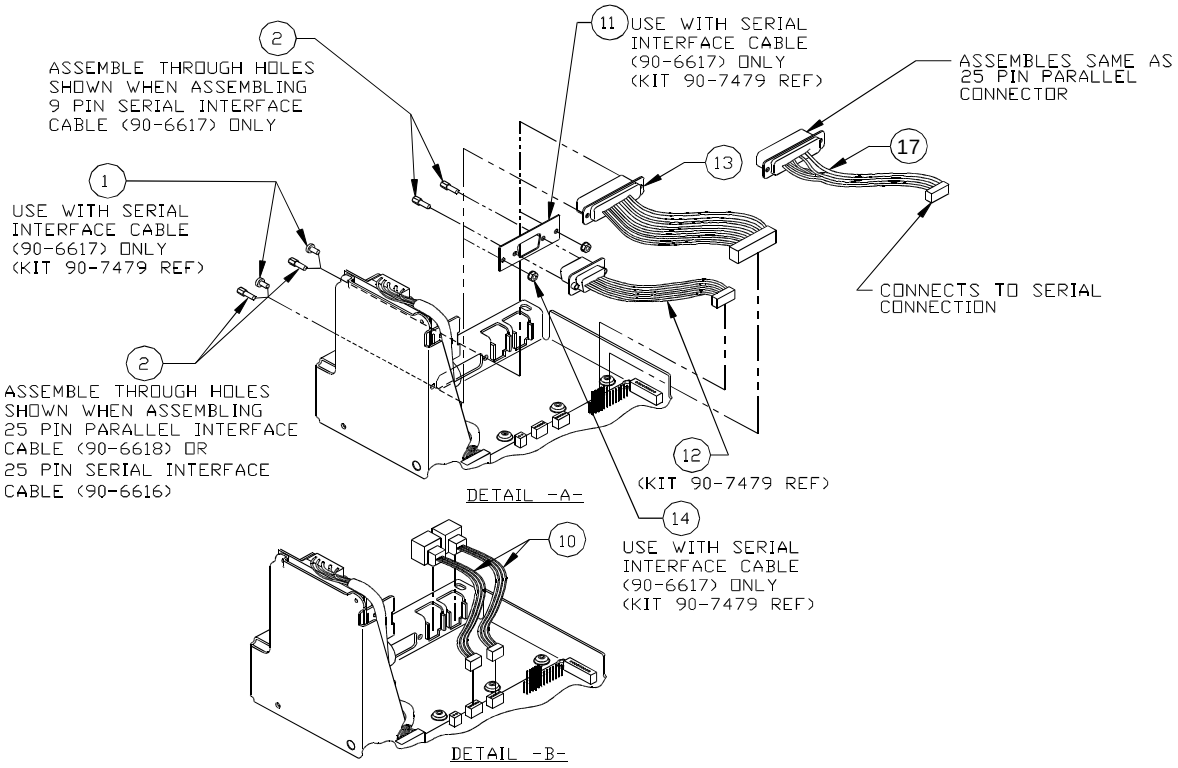
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	06-1112	1	Gear - Idler
2	10-1315	1	Gear - Slip Drive
3	90-6423	1	Bracket - Motor
4	98-1182	2	Screw - M2.6x4mm PHPS PHD
5	520-9800006	1	Retainer - ‘E’ Ring
6	06-1118	1	Gear - 2mm Diameter Pinion
7	06-1187	1	Motor - SOHO DC MICRO
8	90-6624	1	Harness - Take-up
9	90-6460	1	Arm
10	520-9800002	1	Keeper - E-Ring (5133-12)

MECH/ELEC BASE ASSEMBLY



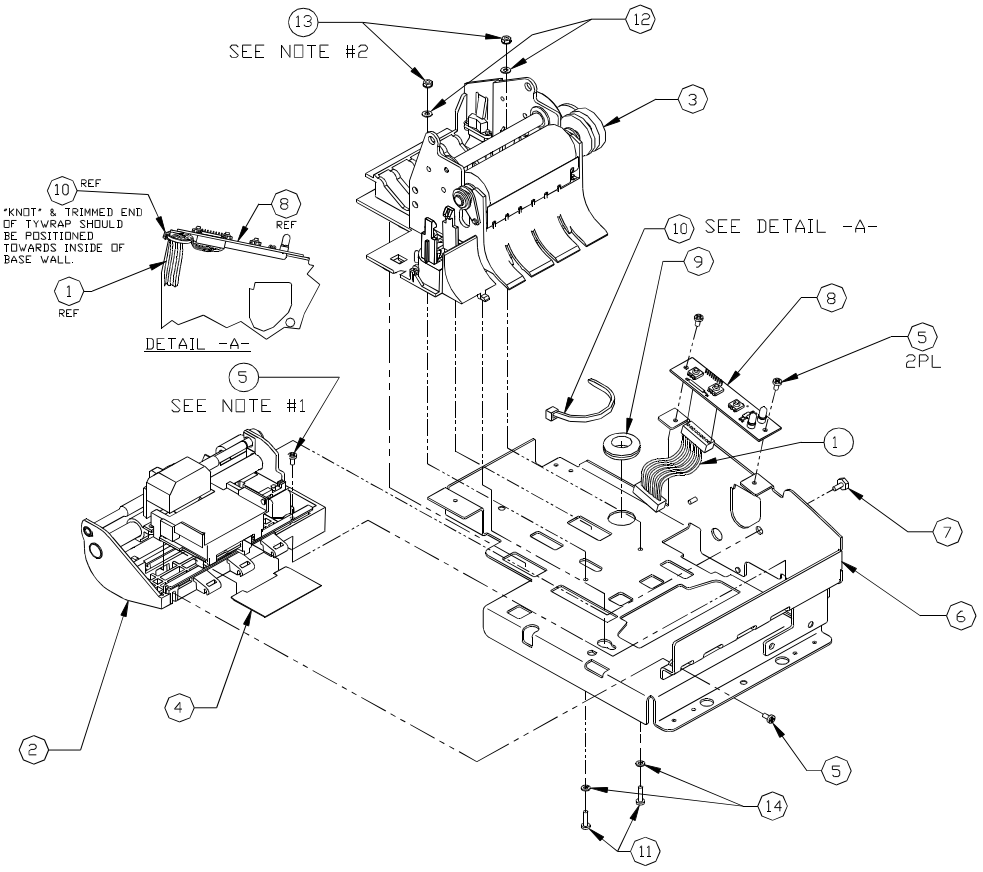
(Continued on Next Sheet)

MECH/ELEC BASE ASSEMBLY (CONT'D)


2
ASSEMBLE THROUGH HOLES SHOWN WHEN ASSEMBLING 9 PIN SERIAL INTERFACE CABLE (90-6617) ONLY
11
USE WITH SERIAL INTERFACE CABLE (90-6617) ONLY (KIT 90-7479 REF)
ASSEMBLES SAME AS 25 PIN PARALLEL CONNECTOR
13
17
1
USE WITH SERIAL INTERFACE CABLE (90-6617) ONLY (KIT 90-7479 REF)
CONNECTS TO SERIAL CONNECTION
2
ASSEMBLE THROUGH HOLES SHOWN WHEN ASSEMBLING 25 PIN PARALLEL INTERFACE CABLE (90-6618) OR 25 PIN SERIAL INTERFACE CABLE (90-6616)
DETAIL -A-
12
(KIT 90-7479 REF)
14
USE WITH SERIAL INTERFACE CABLE (90-6617) ONLY (KIT 90-7479 REF)
10
DETAIL -B-

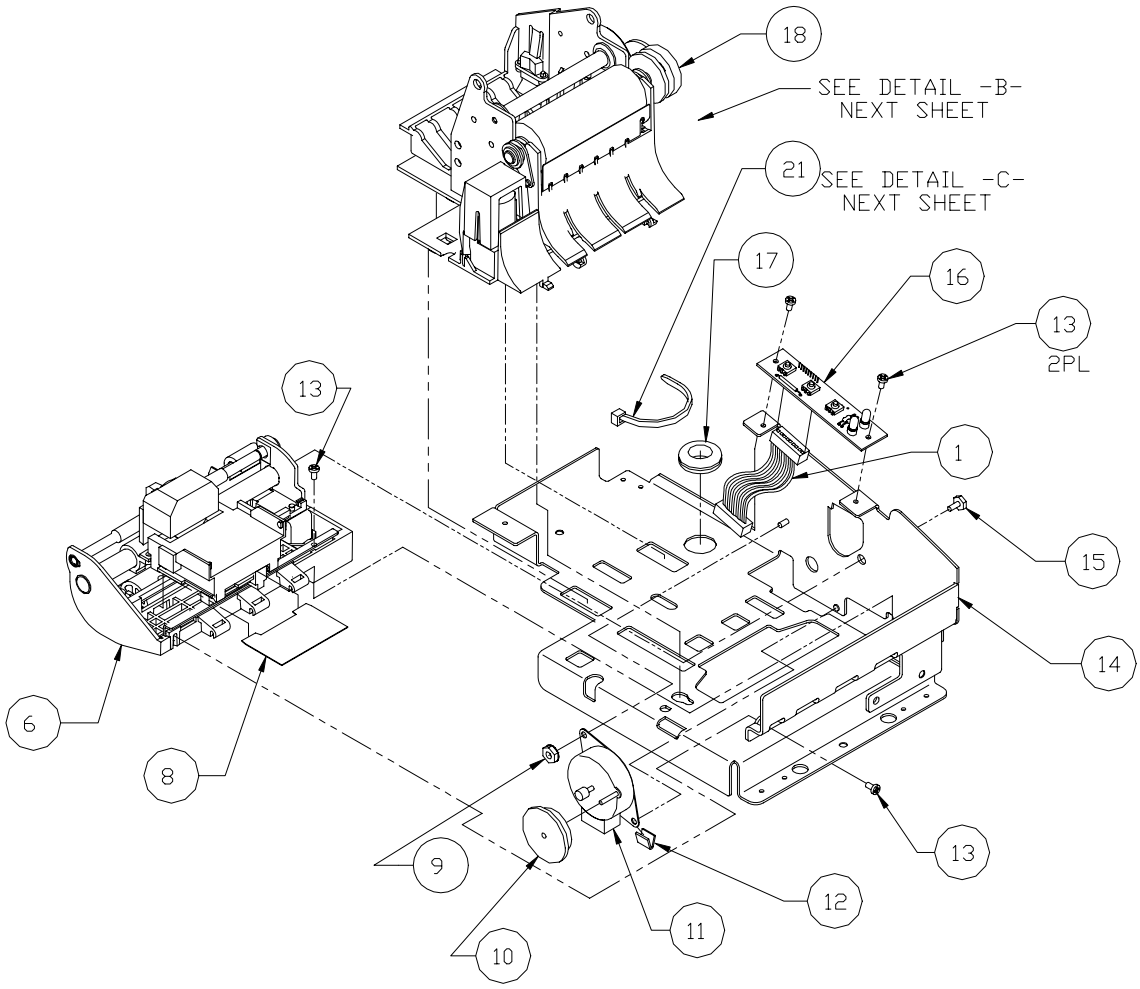
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	98-0611	6	Screw - M3x6mm PHPS PHD
2	98-2033	2	Jack Screw
4	90-6641	1	Harness - Journal Take-up Intermediate
7	90-7550	1	Assembly - Mechanism Base M93 &M94
8	90-7582	1	Assembly - Mechanism Base M91& M92
9	90-7440	1	Assembly - Electronics Base
10	90-6615	2	Harness - Cash Drawer
11	90-6120	1	Plate - Adapter
12	90-6617	1	Cable - 9 Pin Serial Interface
13	90-6618	1	Cable - 25 Pin Parallel Interface
14	98-0621	2	Nut - M3 SEMS
15	90-7461	1	Ref Kit - Take-up
16	90-7479	1	Ref Kit - Serial Interface
17	90-6616	1	Cable 25 Pin Serial Harness Assy. (M91)

MECHANISM BASE ASSEMBLY - MODELS 91/92



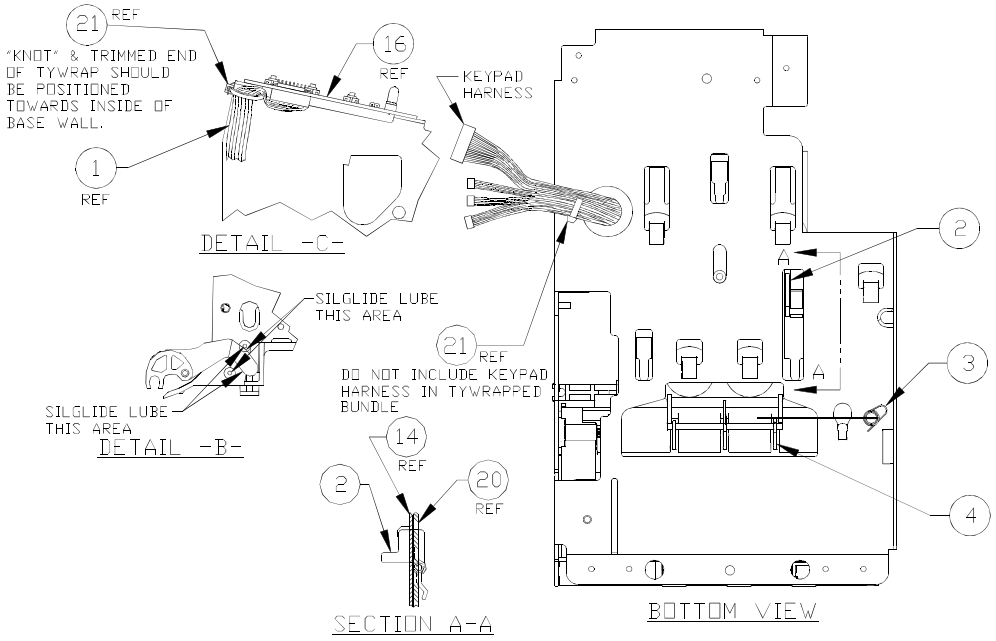
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6619	1	Harness - Keypad
2	90-7887	1	Assembly - Print Mechanism
3	90-9043	1	Assembly - Carrier/Cam Plate
4	90-6054	1	Mylar - Head Cable
5	98-0611	4	Screw - M3x6mm PHPS PHD
6	90-6101	1	Base Assembly
7	06-0579	1	Screw - Carriage
8	90-6580	1	PC Board - Keypad
9	98-6612	1	Grommet
10	98-0941	1	TYWRAP - 3 3/8” Long
11	98-2334	2	Screw - M3 x 12 mm PHPS PHD
12	98-2014	2	Washer - M3 Flat
13	98-0621	2	Nut - M3 Hex W/ Lockwasher
14	98-2096	2	Lockwasher - M3 Split

MECHANISM BASE ASSEMBLY - MODELS 93/94



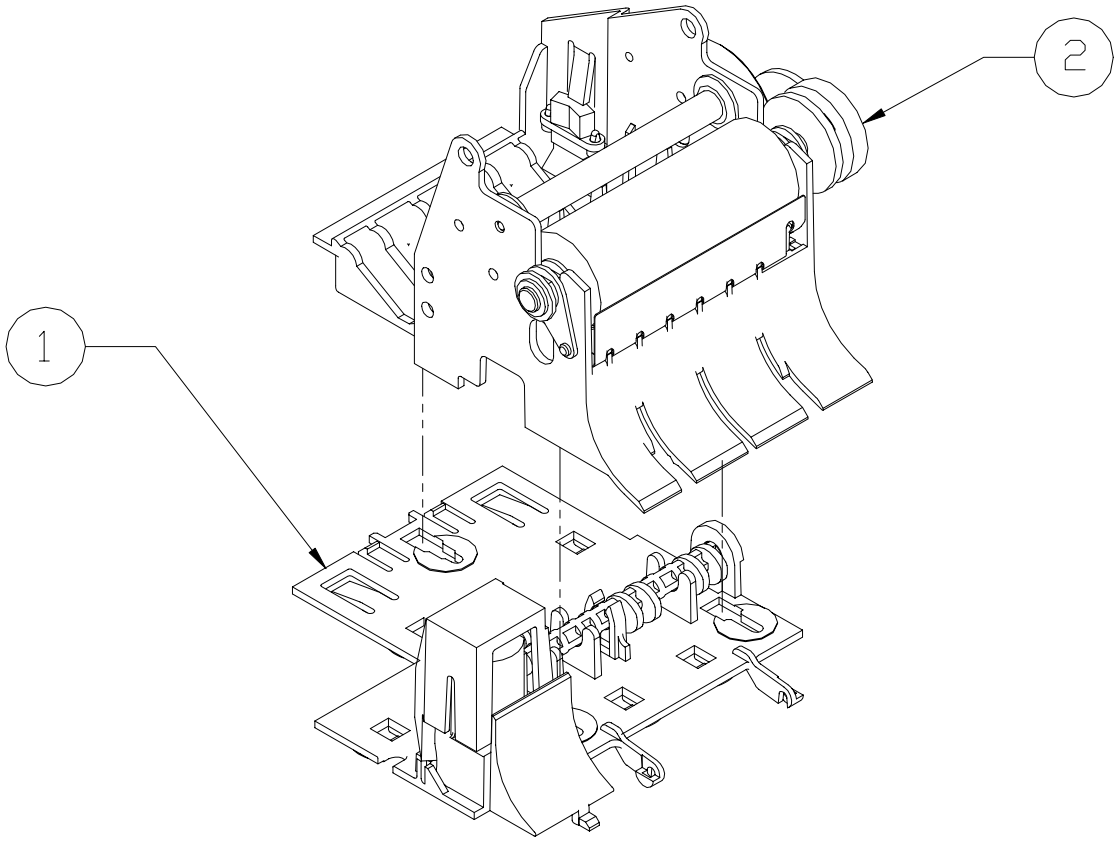
(Continued on Next Sheet)

MECHANISM BASE ASSEMBLY - MODELS 93/94 (CONT'D)



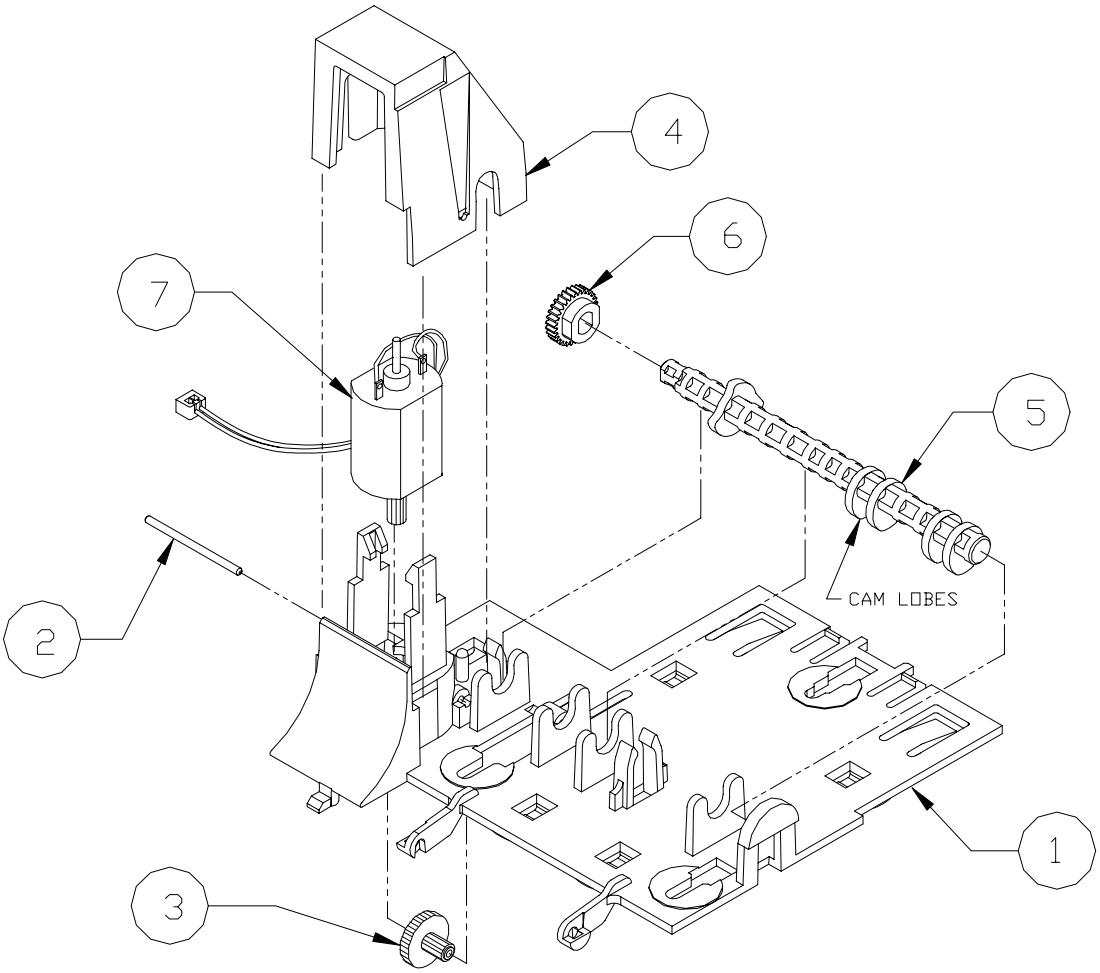
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6619	1	Harness - Keypad
2	90-6032	1	Flag - Cam Sensor
3	90-6121	1	Spring - Slip Stop Sensor
4	90-6118	1	Slip Stop Sensor Flag
6	90-7433	1	Assembly - Print Mechanism
8	90-6054	1	Mylar - Head Cable
9	98-0621	1	Nut - M3 Hex KEPS Lockwasher
10	50-1470	1	Gear - Stepper
11	06-0566	1	Motor - Line Feed (Slip)
12	98-7970	1	Clip - Retainer
13	98-0611	4	Screw - M3x6mm PHPS PHD
14	90-6101	1	Base Assembly
15	06-0579	1	Screw - Carriage
16	90-6580	1	PC Board - Keypad
17	98-6612	1	Grommet
18	90-9044	1	Assembly - Carrier/Cam Plate
21	98-0941	2	TYWRAP - 3 3/8" Long

CARRIER/CAM PLATE ASSEMBLY



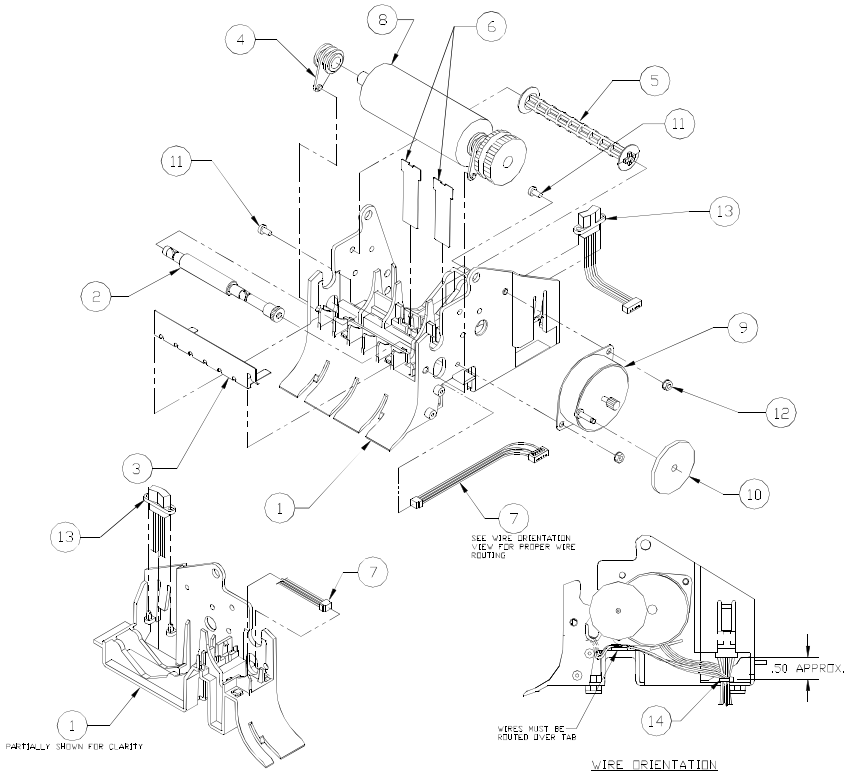
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-7435	1	Assembly - Cam Plate
2	90-7437	1	Assembly - Carrier

CAM PLATE ASSEMBLY



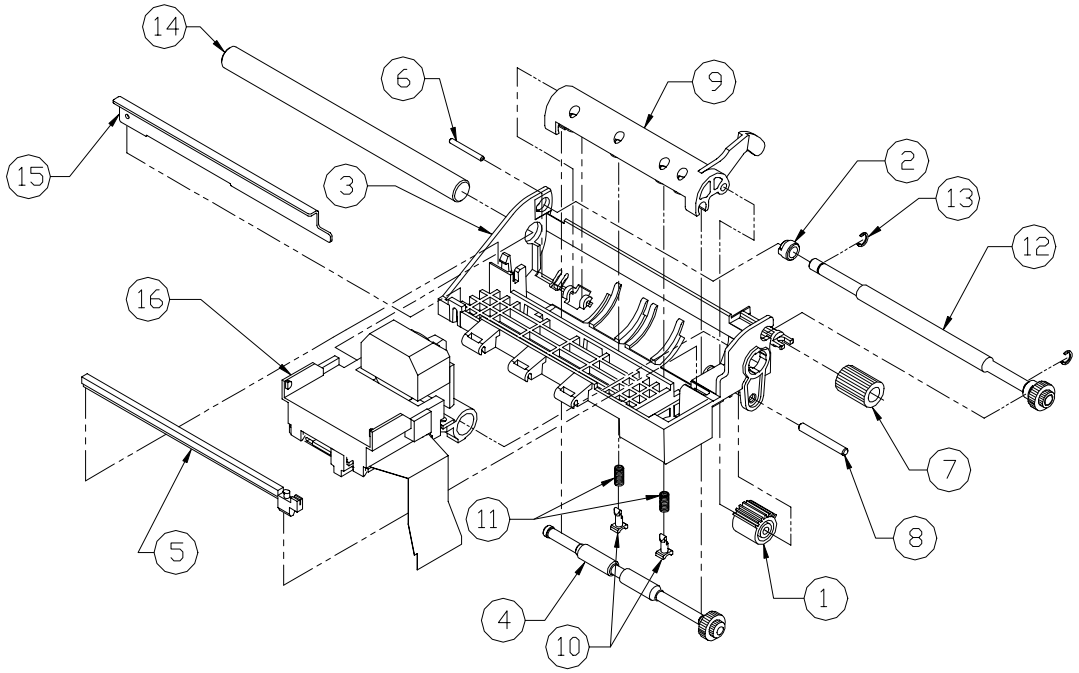
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-9042	1	Plate - Cam
2	90-6031	1	Pin - .078 Diameter
3	90-6035	1	Gear - Compound
4	90-6036	1	Shroud - Motor
5	90-6060	1	Shaft - Cam
6	90-6063	1	Gear - Cam Shaft
7	90-7436	1	Assembly - Cam Plate Motor.

CARRIER ASSEMBLY


PARTIALLY SHOWN FOR CLARITY
SEE WIRE ORIENTATION VIEW FOR PROPER WIRE ROUTING
.50 APPROX.
WIRES MUST BE ROUTED OVER TAB
WIRE ORIENTATION

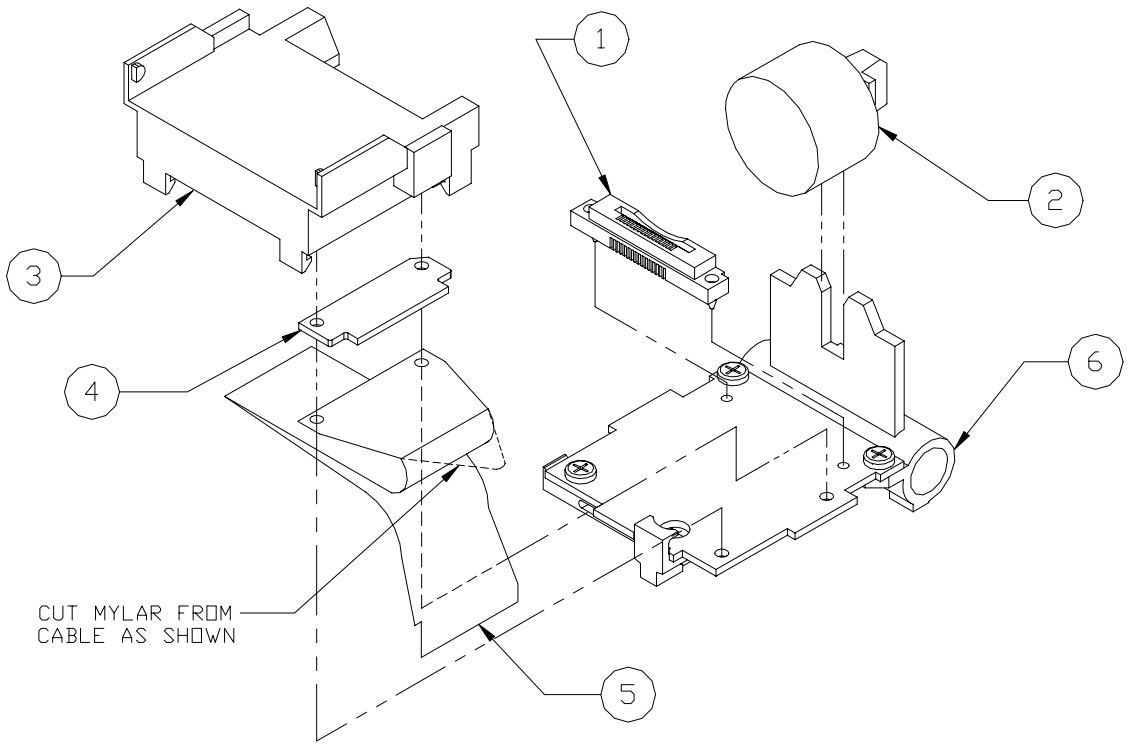
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6008	1	Carrier - Forms Comp
2	90-6014	1	Shaft - Pressure
3	90-6018	1	Plate - Spring
4	90-6022	1	Bearing - Platen
5	90-6024	1	Roller - Receipt
6	90-6026	2	Springs - Forms Comp
7	90-6627	1	Assembly - Forms In Sensor
8	90-7436	1	Assembly - Platen
9	90-6010	1	Assembly - Linefeed Motor
10	90-7346	1	Gear - Linefeed Motor
11	98-0611	2	Screw - M3x6mm PHPS PHP
12	98-0621	2	Nut - M3 Hex KEPS Lockwasher
13	98-0612	1	Assembly - Paper Low Sensor
14	98-0941	1	TYWRAP - 3 3/8

PRINT MECHANISM ASSEMBLY



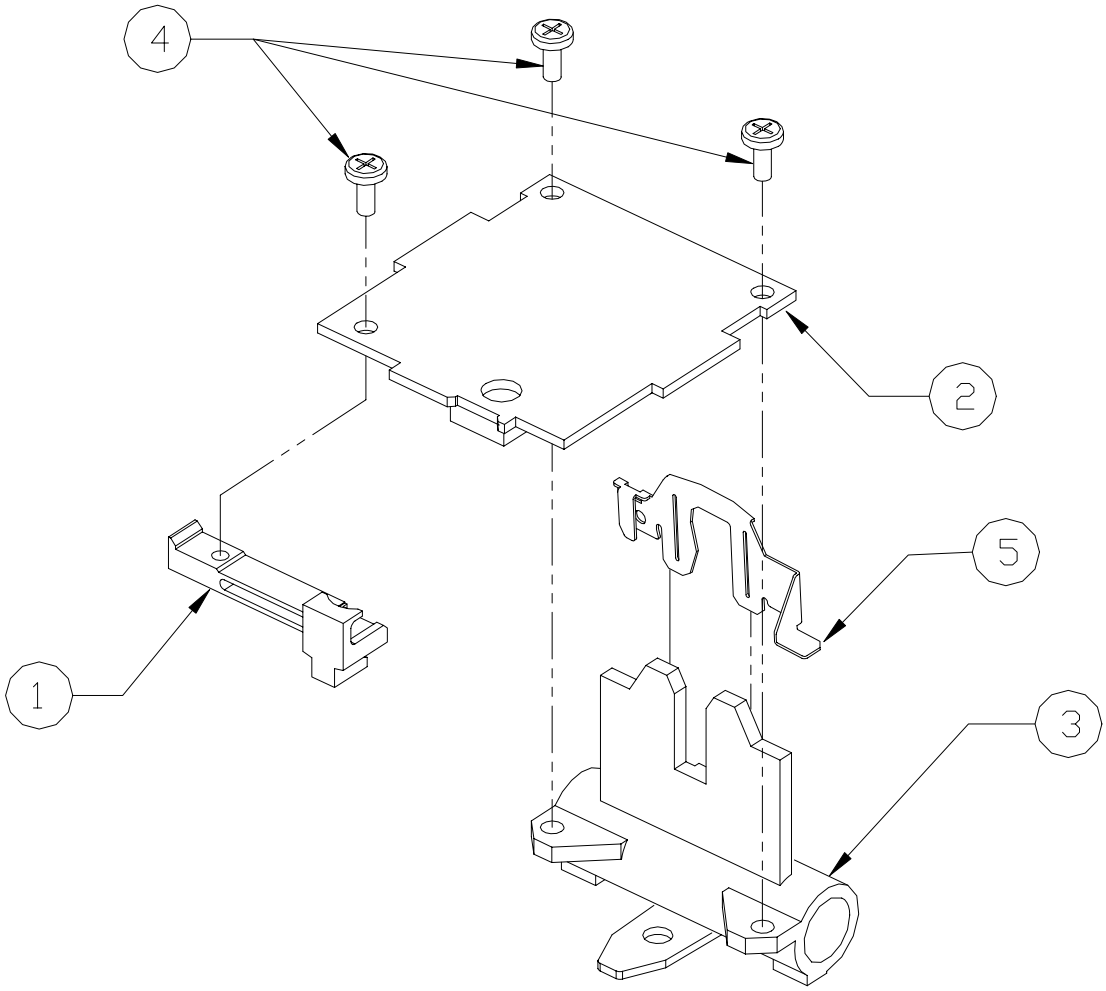
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	06-0546	1	Gear - Idler
2	06-0682	1	Bearing - Feed Roll
3	90-6050	1	Frame - Print Mechanism
4	90-6052	1	Shaft - Slip Drive
5	90-6056	1	Space Rack
6	90-6057	1	Pin - .098 Diameter
7	90-6058	1	Gear - 18T/32P
8	90-6059	1	Pin - .156 Diameter
9	90-6061	1	Actuator
10	90-6062	2	Bearing - Actuator
11	90-6064	2	Spring - Compression - Actuator
12	90-6051	1	Assembly - Validation Shaft
13	520-9800104	2	Retainer - ‘C’ Ring .23 Diameter
14	90-6000	1	Shaft - Carriage
15	90-6053	1	Rail - Carriage
16	90-7432	1	Assembly - Carriage

CARRIAGE ASSEMBLY



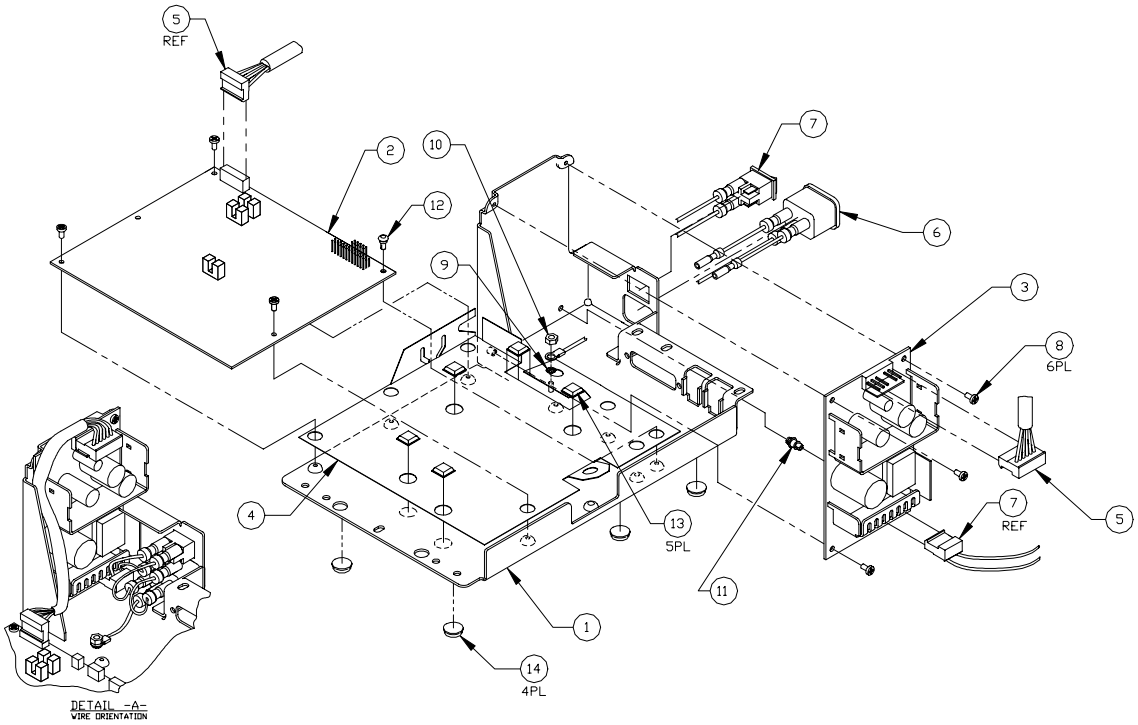
ITEM NO.	PART NO.	QTY	DESCRIPTION
1	06-0574	1	Connector - Printhead
2	90-7337	1	Printhead - M90
3	90-7338	1	Assembly - Ribbon Feed Gear
4	90-7339	1	Rubber - Contact Pressure
5	90-7340	1	Cable - M90 Head
6	90-7431	1	Assembly - Carriage Motor

CARRIAGE MOTOR ASSEMBLY



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	06-0575	1	Slider - OKI
2	06-0578	1	Assembly - Space Motor
3	90-7341	1	Roller - Carriage
4	90-7342	3	Screw - Carriage
5	06-0571	1	Clamp - Printhead

ELECTRONICS BASE ASSEMBLY



ITEM NO.	PART NO.	QTY	DESCRIPTION
1	90-6106	1	Base - Electronics
2	90-7347	1	Assembly - Controller Board
3	98-9047	1	Assembly -Power Supply
4	90-6613	1	Insulator
5	90-9046	1	Harness - DC Power
6	90-7441	1	Assembly - AC Inlet
7	90-7442	1	Assembly - Power Switch
8	98-0611	6	Screw - M3x6mm PHPS PHD
9	98-0653	1	Lockwasher - M3
10	98-1832	1	Nut - M3 Hex Jam
11	98-7476	1	Standoff - Power Assembly
12	98-6122	1	Snap Rivet
13	98-6614	5	Foot - Rubber (PCB Mount)
14	06-0553	4	Foot - Rubber (Printer Bottom)

APPENDIX C: SCHEMATICS

INDEX